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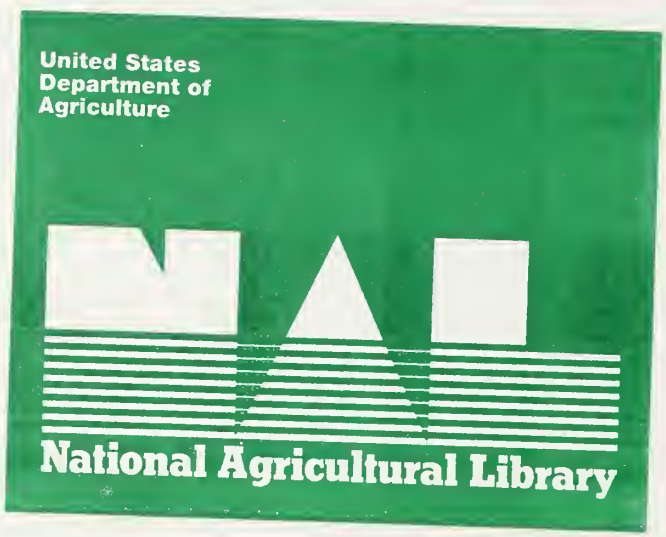
USDA REPORT ON OSHA REQUEST FOR INFORMATION ON SAFETY AND HEALTH HAZARDS IN GRAIN HANDLING FACILITIES

POLICY, RESOURCES, AND TECHNICAL
SERVICES DIVISION
OFFICE OF SAFETY AND HEALTH MANAGEMENT
U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C. 20250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INSPECTION AND EVALUATION REPORT

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USDA Report on OSHA Request for Information on Safety and Health Hazards in Grain Handling Facilities	TR-80-5	June 26, 1980
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EXECUTIVE SUMMARY

This report is a composite response prepared by USDA to the Occupational Safety and Health Administration (OSHA) request for information published in the Federal Register on February 15, 1980. Information provided in this report is a compilation of responses prepared by agencies in the USDA regarding the specific occupational health and safety hazards associated with grain handling activities, as well as the economic and environmental impact of controlling safety and health hazards.

Information provided in this report includes information regarding fire and explosion hazards as well as health problems due to exposure to grain dust, chemicals, pesticides, and biological agents.

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United States Department of Agriculture
Office of Safety and Health Management
Washington, D.C. 20250

July 2, 1980

Honorable Eula Bingham
Assistant Secretary for
Occupational Safety and Health
U.S. Department of Labor
200 Constitution Avenue, NW
Room S 2315
Washington, D.C. 20210

Dear Eula:

Reference your letter dated March 4, 1980, enclosed in the USDA composite response to the Federal Notice on "Occupational Safety and Health Hazards in Grain Handling Facilities."

The composite response was prepared and coordinated by the Office of Safety and Health Management (OSHM) with full cooperation from the Federal Grain Inspection Service (FGIS); Office of the Special Coordinator for Grain Elevator Safety and Security, Office of the Secretary (SEC); Science and Education Administration (SEA); Agricultural Marketing Service (AMS); and the Director of Economics, Policy Analysis and Budget.

The U.S. Department of Agriculture greatly appreciates the opportunity to provide comments in this major effort to protect grain elevator employees.

Sincerely,

JULIUS C. JIMENO
Director

Enclosures

USDA COMMENTS ON "STANDARD FOR OCCUPATIONAL EXPOSURES TO SAFETY AND HEALTH HAZARDS IN GRAIN HANDLING FACILITIES"

1. Question: General Safety Concerns. (a) Should OSHA require material safety data sheets or equivalent forms that supply employees with basic information (e.g., manufacturer, chemical and trade name, physical and chemical properties, hazards, etc.) for hazardous materials used in grain handling facilities? What information should be contained in these material safety data sheets?

   Answer: Material Safety Data Sheets are necessary to describe chemicals which are utilized in grain elevators. The chemicals which must be identified include pesticides used in the grain and chemicals used in the USDA aflatoxin laboratories. If properly completed, the OSHA Form 20 will provide adequate information on toxicity, medical treatment, and other aspects of the chemicals.

   Question: General Safety Concerns. (b) Should OSHA require preplanning for workplace disasters as a part of written emergency action plans? Should such plans require planning and coordination with outside resources such as hospitals, ambulance services, and police and fire departments to ensure appropriate response to workplace disasters? What types and frequency of training should be required for employees who will be affected by such plans? What other elements should be considered for inclusion in such plans?

   Answer, Part 1: OSHA should require preplanning for workplace accidents and disasters. The worth of this type of planning is evident and necessary in a rational risk management program. Since all accidents cannot be prevented, it is necessary to make some attempt to minimize potential losses. This can be achieved only through contingency planning.

   Part 2: Since, when accidents and especially disasters occur, a grain handler will have to rely on local emergency services, it is important that these service agencies (a) are aware of the type and extent of service which may be required, (b) understand possible contraints in delivering those services, and (c) are thoroughly familiar with the particular facility. It is equally important for the grain handler to know exactly what he can expect from these agencies. None of these can be obtained with any confidence unless coordinated preplanning takes place.

   Part 3: Observant, well-trained employees must play a major role in any successful safety operations program. The prudent employer recognizes this and trains his employees to recognize potential hazards and to take the appropriate corrective (or other) action. While the employer must assume a large part of the responsibility for providing a safe and healthful work environment, the employee also must assume his share of responsibility for his own and his coworker's safety, as well as for the safety of his employer's property and its continuing operation as a viable entity. The employee cannot do these things effectively unless he receives or obtains the necessary training.

One of the major deterrents to achieving safety is ignorance ... either management's, the employee's, or both. In order to alleviate this, training should be available as follows:

a. Hazard recognition.
b. Safe work practices and hazard avoidance.
c. Appropriate hazard response actions and procedures.
d. Need for and proper use of personal protective equipment.

These types of training should be available at the time of initial employment and periodically thereafter in the form of plant safety meetings. The frequency and content of these meetings should remain a management prerogative, but it should be noted that an employer's rigorous attention to these details often fosters a similar concern and attention in the employee.

1. Part 4: USDA's Special Coordinator for Grain Elevator Safety and Security has prepared a self-evaluation checklist for managers of grain handling facilities. This checklist is based on the concept that operation of a safe facility entails combined activity in and attention to many different aspects. A copy of the checklist is attached.

Question: General Safety Concerns. (c) Is there a synergistic effect between combustible dusts and fumigants which increases the potential for explosions?

Answer: To our knowledge, there is no chemical reason to expect a synergistic effect between combustible dusts and fumigants which would increase the potential for explosions.

Question: General Safety Concerns. (d) Is spontaneous combustion of grain a problem in handling facilities?

Answer: No. This is not a problem in commercial facilities. Spontaneous combustion of grain occurs only under adverse conditions of grain storage, that is, a moisture content usually greater than 16 percent which supports active mold growth. With sufficient mold growth, heat is generated and spontaneous combustion may occur. Commercial grain facilities are aware of the problem and currently take the necessary steps to reduce moisture content prior to storage.

Question: General Safety Concerns. (e) Are Grain elevators operating at overcapacity? What dangers may result from operating at overcapacity?

Answer: To answer this properly, there is a need for a definition of overcapacity. Most grain elevators are planned with the expectancy they will be operating long hours during the harvest season and in the case of river, lake, or export locations during the navigation season. Consequently, motors, belts, legs, and other moving equipment are designed for such use. Thus, of itself, overcapacity is not a danger. There would be danger if during such peak periods maintenance and operating personnel were not adequate.

1. Question: General Safety Concerns. (f) Are there significant differences between the fire and explosion hazards of the various grain dusts? If so, which grain dusts would require specific provisions? What should be the content of these provisions?

Answer: Yes, major differences. However, the least explosive dust under certain conditions can be as dangerous as the most explosive dust. Several factors must be used to determine likelihood of explosion. They are:

Material	Index of Explosibility
Wheat	2.5
Soybean Meal	7.5
Corn	8.4
Grain Dust, Mixed	9.2
Cornstarch	35.6
Wheat Starch	49.8

Bureau of Mines officials said that, while the index could be used for research on grain dust explosions, it has limited application for elevator operators. The index only rates the relative explosibility of various grain dusts. There is no practical way of using the index to determine the presence or extent of explosion hazards within an elevator at any time. Variable factors, such as dust particle size and moisture content, affect the degree of hazard. Experimental work has not quantified the relationship of these variables. Reference "Grain Dust Explosions - An Unsolved Problem," a Comptroller General Report to the Congress.

1. Question: General Safety Concerns. (g) Should operators of grain handling facilities be required to conduct a system safety analysis of their operation? If so, what grain handling facilities should be affected by the requirement and why?

Answer: Yes. However, hazards vary by size and type of operation. Required rules must recognize the ability of the operators to conform. Although a system safety approach can be an effective tool in a risk management program, many smaller, independent grain handlers could not comply with this type of OSHA requirement. In reviewing available literature, it is apparent that similar safety and health hazards occur throughout the grain handling and processing industries. Insofar as any facility, i.e., country elevator, terminal, crushing plant, miller, etc., has operations and conditions which are similar to others within a particular group, a systems approach to the entire group could be expected to yield results which are generally applicable to all facilities in that group. The development of general goal-oriented standards would provide a broad basis for compliance.

2. Question: General Health Concerns. (a) To what extent are the dust, biological and pesticide hazards the same in all grain handling and processing industries?

Answer: Available information suggests that they would be quite different. These differences are influenced by: throughput of the operation, type of grain handled, varietal differences, production location, harvesting season, year of harvest, elevator practices, type of processing and handling, type and quantity of pesticides and/or fumigants used, and work location and function of employee.

Question: General Health Concerns. (b) To what extent are these hazards different in the various grain handling and processing industries?

Answer: As noted in our response to 2(a), the extent and degree of the hazards involved are dependent upon numerous variables in the production location, environment and management practices in the type and quality of the grain, in the mode and efficiency of handling, in the mode and efficiency of processing, and in worker location and job function. Each component and operation is unique.

Question: General Health Concerns. (c) What other hazards, such as exposures to chemicals used in processing grain, are found in these industries?

Answer: The processing of grain does not appear to present health hazards other than those previously mentioned. Those health hazards are the result of exposure to grain dust, fumigants, biological and physical agents.

3. Question: Scope and Application. The grain handling industry can be defined broadly to include all operations involved in processing grain products, from growth of the grain to shipment of the final product to the consumer, or be more narrowly defined to include only some of these operations. OSHA requests comments and information on the following: (a) Should the scope and application of a standard for safety and health hazards in grain handling facilities include all industries involved in grain handling or processing (such as grain elevators, grain milling, flour milling, grain and rice drying, flour and soybean processing, cereal production, grain alcohol production, and the preparation of bakery and confections products)? Are there reasons for excluding any industry or operation?

Answer: Many hazards are controllable using present OSHA standards. The standards which must be written specifically for the grain industries should include all operations involved in processing grain products. However, the different portions of the grain handling industry such as elevators, milling, malting, and baking should be able to identify those standards applicable to their operations.

Question: (b) Are there any other industries that use grain or grain products in which employees risk exposures to these hazards?

Answer: The scope and extent of the dust, biological, and pesticide hazards are not sufficiently defined to identify specific industries in which employees risk exposure to these hazards.

4. Question: (a) Preventive Measures. (i) Should automatic shutdown be required when a segment of the grain handling system fails to function as intended (e.g., dust control equipment failure, bucket elevator slippage, electrical failure, choked legs or conveyors, grinding and milling machine breakdowns, overheated bearings) or when a fire occurs? How often do equipment failures occur?

Answer: OSHA should require interlocking and automatic shutdown of certain equipment, operating as a system, when the failure of one part of that system creates a health or safety hazard. For instance, operation of conveyor belts in a gallery or tunnel when dust control equipment is not functioning could result in dangerous accumulations of dust which manual housekeeping might not be able to handle effectively. In order to prevent this health and safety hazard, the belts should be interlocked with the dust control system. Operation of belts which are not in an enclosed space would pose no safety or health problem if dust collection equipment were not functioning (although such operation might create an environmental problem).

The determination of what equipment must be interlocked should be determined on a case-by-case basis. In most cases, the failure of one piece of equipment would not require halting operations throughout the entire facility.

Equipment failures are thought to be extremely common in grain handling facilities. Pages 26-28 of the USDA report, "Prevention of Dust Explosions in Grain Elevators--An Achievable Goal," presents information about hazards, including equipment failure, reported to FGIS through their Hazard Alert System. Additional and more recent information is on file with that agency.

Question: (a) Preventive Measures. (ii) Should heat sensor alarms for bearings be required? What bearings should be monitored and at what temperature should alarms activate? What types of sensors should be used?

Answer: Hot bearing detectors may not be necessary if other procedures are used. Especially for smaller, low volume facilities, use of high technology heat sensors may be inefficient. There are several alternatives such as manual inspection, infrared scanning, salt type detectors, temperature sensitive paints, and vibration and noise sensors. These techniques are described in detail in a presentation by John A. Johnston of Cargill, Inc., in a presentation before the 1979 National Grain and Feed Association (NGFA) Grain Elevator Design Conference. In individual cases, the use of such techniques may be more appropriate than hot bearing detectors.

Again, where possible, OSHA should limit regulations to goal-oriented criteria rather than the methodology.

It should be pointed out that automatic shutdown of a hot bearing may, in many cases, pose an additional safety hazard. For instance, in a leg, when an overheated roller bearing is allowed to remain in contact with the belting material which happens to stop over the bearing, if the heat is great enough, the belting can burn through causing the belt to drop down through the leg casing. Recent explosion experience indicates this may have been a cause in several incidents. Regardless of the type of detection technique used, response to the overheated bearing assumes critical importance and should be clearly specified in maintenance instructions for the various types of equipment in grain handling facilities.

4. Question: (a) Preventive Measures. (iii) Should there be overload relays on motors that stop drive pulleys to avoid overheating if belts slip or bucket elevators become clogged?

Answer: Overload relays in conjunction with slow-down devices should be required in new installations of process and stock handling equipment. They are invaluable when used with equipment interlocks when feeding additional material is likely to cause a worsening of the problem which resulted in the original overload or slow-down.

Question: (a) Preventive Measures. (iv) Should there be heat sensors over belt conveyors in galleries and tunnels? If so, where should they be placed and at what temperature should they be set to activate?

Answer: If the purpose of monitoring devices in these locations is to detect burning material on belts, then it would be better to install temperature sensors in the storage and work bins, and in other locations like dryers. Fires in bins are easier to control and to extinguish than if the burning material were distributed by belts through galleries and basements. Moving the grain creates additional dust which adds to the hazard. Temperature sensing devices should not be required at the locations specified in the question.

Question: (a) Preventive Measures. (v) Should there be speed indicators on bucket elevators and other conveyor belts to indicate when the speed is so slow that slippage of belts may occur, thus causing overheating? At what speed does slippage become a hazard? What should be the alarm and shutdown procedures? Should there be belt alignment sensors? If so, what type?

Answer: Double set-point speed indicators should be used on new leg, belt conveyor, and auger installations, as well as on major retrofits involving this equipment. Current recommendations are in the range of 10 and 20 percent speed reduction below full load speed for the two set-points. The first set-point should be used as an alarm while the second is used in conjunction with interlocks to halt equipment feeding that particular device. Misalignment or limit switches should be required for both conveyor belts and legs. The major criteria for selecting such switches should be reliability and durability. Such switches should also be interlocked with upstream equipment to prevent plugs and spills.

4. Question: (a) Preventive Measures. (vi) Should explosion suppression systems be required in elevator legs, enclosed conveying equipment, grinding and milling machinery, and dust collection equipment? If so, why and what kind? What is the cost of such systems for these operations?

Answer: Explosion suppression should be used if the equipment cannot be adequately vented or if it is not constructed to contain the effects of an explosion. An additional use is to prevent flashback into a facility if outside equipment suffers an explosion. The reliability of explosion suppression systems for legs has not been field tested to any extent in the grain industry. Unintentional triggering of the systems may be common and recharging can be quite expensive.

Question: (a) Preventive Measures. (vii) Should all grain handling facilities be required to have sprinkler system protection throughout the facility? Should the size of the facility determine whether sprinkler systems are necessary? Are sprinkler systems necessary for employee safety?

Answer: Sprinklers should be used in all facilities where combustibles are stored, but especially in flat storage buildings. Large drop sprinklers have been shown to be more effective in many cases than standard sprinklers. A functioning sprinkler system, by limiting the spread of a fire, can reduce losses. To a certain extent, sprinkler systems eliminate the need for a plant fire brigade, thereby eliminating the danger to employees of firefighting.

Question: (a) Preventive Measures. (viii) Should there be written shutdown procedures for choked legs, stalled conveyor belts or jammed milling machines? Should jogging (a method of shaking loose stalled bucket elevators which tends to suspend dust in air) be prohibited as a method of clearing equipment such as bucket elevators? Should there be written startup procedures for when the problem is cleared? Should these written shutdown and startup procedures be distributed to employees or posted at points of operation, or both?

Answer: While written instructions and procedures are ideal, they may not be necessary in all cases. This is especially true of smaller operations with only a few employees. Where possible, startup and shutdown procedures should be clearly posted at the operator station or control room. Emergency shutdown, response, and startup procedures should be provided in checklist form to the operator and continually stressed at safety meetings. Jogging legs should be prohibited entirely, and the capability of jogging designed out of the equipment. A delayed time reset would achieve this.

Question: (a) Preventive Measures. (ix) What criteria should OSHA use to determine the fire resistance and electrical conductivity of conveyor belts? What test procedures should be used?

Answer: Studies to identify the criteria that should be used to specify the fire resistance and electrical conductivity of conveyor belts are presently being supported by the National Grain and Feed Association (NGFA). Mr. James Maness of the NGFA should be consulted for specific information (202-783-2024).

4. Question: (a) Preventive Measures. (x) Should OSHA require explosion venting? Where should the venting be placed and how should the amount of venting be determined? What costs are associated with explosion venting?

Answer: OSHA should require explosion venting. In general, venting should be required for equipment subject to dust explosion hazards and to work or processing, storage, and handling areas where these hazards are likely to exist. The amount of venting area required for a given volume can be determined through use of the nomographs contained in NFPA 68, "Explosion Venting." Design of facilities for optimum explosion relief venting entails a reordering of priorities which may result in a less than optimal use of internal space. Higher operating costs should be expected in some cases. However, to some extent, this would be offset by reduced material costs at the time of construction, and such other factors as reduced insurance premiums and a reduction in business interruption should an explosion occur. Studies on explosion venting will be initiated via contract by SEA in the coming fiscal year.

Question: (a) Preventive Measures. (xi) Should new bucket elevator legs be located outside of the main elevator structure? Would this reduce the fire and explosion hazard:

Answer: When other alternatives such as inclined belts are not feasible, new legs should be constructed outside of enclosed structures. Legs should not be constructed using concrete wells which are an integral part of the structure. Where legs are placed inside structures, they should be constructed in such a manner so as to allow venting to the external atmosphere.

A study of recent explosions indicates that legs are the primary location for most of the incidents. Improved design and operation of elevator legs very clearly means improved safety and reduction of fire and explosion risks.

Question: (a) Preventive Measures. (xii) Should new bearings be located outside of the grain handling equipment; i.e., outside of the casing? Would this reduce the fire and explosion hazard?

Answer: In cases where the bearing is exposed to corrosive, abrasive, or explosible dusty conditions inside the equipment, the bearing should be placed externally, where possible. This reduces the amount of maintenance required on the bearing and, because the bearing is accessible, increases the probability that it will be serviced regularly. Although outside placement of bearings would tend to reduce fire and explosion hazards in the equipment, the major factors are proper operation and maintenance.

Question: (a) Preventive Measures. (xiii) Should warehousing and bagged finished product facilities be maintained as separate areas from mills and other processing areas by a separate building or by an interior fire wall?

Answer: Isolation of warehousing, bagging, and finished product storage as well as the isolation of other handling, storage, and processing areas is strongly recommended by Palmer. This practice will reduce losses should a fire or explosion occur.

Question: (a) Preventive Measures. (xiv) Should horizontal surfaces be kept to a minimum to limit the surface area to be cleaned in new grain handling facilities? Should OSHA require that surfaces which are inaccessible for adequate cleaning be inclined not less than 60 degrees?

Answer: Dust accumulated on horizontal ledges may be of relatively minor importance in comparison to the explosion hazard of dust accumulated on walls, ceilings, and floors. Where possible, open construction and expanded metal flooring are strongly recommended.

OSHA should not require that inaccessible surfaces be inclined at a 60-degree angle, or greater. In many cases, such as ducts and pipes, compliance would be impossible. In addition, such a requirement would be difficult to enforce since it would probably require OSHA to review and approve all new designs prior to construction. In terms of improved worker health and safety, the benefits might not justify the cost of enforcement and compliance.

4. Question: (b) Dust Control. (i) What design criteria should be used for dust control systems? Should the employer be required to receive a certified affidavit from the equipment supplier and installer that the dust control equipment meets the employer's specifications? Should an acceptance test be conducted to assure that newly installed dust control equipment functions properly?

Answer: The NSF/NAS Panel on Causes and Prevention of Grain Elevator Dust Explosions currently is developing standards for design, installation, operation, and maintenance of dust control systems (primarily pneumatic systems). The present criteria for the above are generally inadequate as applied to grain handling facilities. When completed, these new standards should be applied by the grain industry.

Requiring an affidavit that dust control systems meet operator standards misses the point entirely at this time. One of the major problems in this area is that the purchaser of dust control equipment often does not have adequate performance standards. A major educational campaign is needed.

Acceptance testing of dust control systems should be a contractual obligation for all grain elevator installations.

Question: (b) Dust Control. (ii) Should dust collection equipment be of the two stage type; i.e., cyclone and fabric filter? Are there other types of collection systems that can effectively control grain dust emissions?

Answer: Two-stage dust collection systems have been used effectively by FarMarCo, Inc. in several of their facilities. Although power requirements and initial and operating costs are higher than for normal single-stage systems, the two-stage systems allow increased product recovery of larger particles (if low-efficiency cyclones are used), thereby reducing inventory shrinkage. At this time, the effect of two-stage systems on the fire and explosion problem is theoretical. However, segregating the smaller particles prone to extreme drying during the fabric filtration process could result in

a reduction of the fire and explosion problem. In simple terms, removing the small, dry, dust particles from the stock handling system reduces the explosion/fire potential by reducing the amount of fuel available and increasing the ignition energy requirements for that dust which escapes the stock handling system.

Other techniques are being tested at this time but are not widely available.

4. Question: (b) Dust Control. (iii) What engineering controls are currently used in grain handling facilities? How efficient are these controls in controlling dust emissions?

Answer: The equipment now in use ranges widely. We do not have a comprehensive evaluation of the relative effectiveness of each type. Dust control in most existing grain elevators is not adequate to either prevent an explosion or reduce losses should an explosion occur.

Question: (b) Dust Control. (iv) Are special dust controls necessary for those grain handling facilities that only store grain dust or process dust for feed?

Answer: Special techniques such as pneumatic conveying or enclosed equipment should be used in facilities where dust is a major processing ingredient. To operate safely and efficiently, handling and processing equipment must be designed with the small particle size and the hazardous nature of the material as primary considerations.

Question: (b) Dust Control. (v) Should dust particles smaller than 40 microns (or some other size) be prohibited from being returned to the grain stream in any facility?

Answer: The USDA has taken the position that grain dust should not be recirculated but may be treated as an unavoidable handling loss, and that particle size limits be established to prevent abuses of the system. Present knowledge of grain dust characteristics and dust explosibility shows that dusts less than 40 microns are the most dangerous, being the easiest to ignite and exploding with the most violence. Materials between 40 microns and 125 microns in size have also been termed fine dust in a significant number of research papers and also explode in laboratory testing. The dangers posed by the dusts up to 125 microns justify further consideration to not return this material to the grain handling systems. This position is based on research conducted by industry and government agencies and on specific recommendations by the U. S. Grain Standards Act Advisory Committee.

Since the disasters in 1977, much attention has been focused on the explosion problem by the public, the grain industry, and the Federal Grain Inspection Service. That attention has been directed at cost effective ways to minimize grain dust explosion hazards and ensure the safety of elevator and FGIS personnel working in these facilities. Dr. Bartelt, Administrator of FGIS, sent a letter to 137 elevator operators requesting that collected dust not be returned to the grain stream. The U. S. Grain Standards Act Advisory Committee recommended that dust extracted by elevator dust collection systems be treated

as an unavoidable loss, that certain controls be established to ensure that elevator safety is promoted, and that FGIS monitor the industry to ensure that there are no abuses of the system. This can be accomplished by (1) prohibiting the return of dust to grain so as to reduce dust explosion hazards, and (2) establishing limits on particle size that constitute dust.

4. Question: (b) Dust Control. (vi) What effects, if any, do the various handling operations have on the amount of dust that accumulates in the grain? Do these operations affect the size of the grain dust and consequently the efficiency of the dust collecting systems?

Answer: Each time grain is handled, broken kernels and dust are created to various degrees, depending on the handling system and the grain. Martin and Stephens completed work at the FGIS U. S. Grain Marketing Research Center in Manhatten, Kansas, to study the effects of repeated handling on broken corn and dust generation. They showed that the amount of dust collected increased initially and then remained constant during 20 handlings, even though breakage increased. The amount of dust collected was affected by handling and dust system configuration. The fine fraction (smaller than 125 microns) decreased slightly during repeated handling with an average of 70 percent of the material collected being less than 125 microns. This work also showed that nearly all additional dust created (.002 percent with each transfer) consisted of particles larger than 125 microns.

FGIS and Cargill conducted a cooperative study to investigate dust concentrations and characteristics inside enclosed work areas and equipment at large grain terminals. The major objective of this work was to identify types of locations and commonly used equipment in which explosible dust tends to accumulate to hazardous levels and to provide data as to the physical and chemical makeup of that dust.

Dust samples were collected from 14 to 20 work area sites at four terminal elevators to measure the levels of airborne and respirable dust occurring. These samples were taken with dust systems both operational and shut-off to observe changes in dust levels, provide information on the dust system's effectiveness, and determine if hazardous concentrations result without use of the dust system. Results indicated that under normal operating conditions, most work areas did not contain concentrations exceeding 0.10 g/m^3. Concentrations did increase significantly at several sampling locations with the dust collection systems shut off. The most significant increases occurred at receiving and cleaning locations.

Grain handling equipment contained concentrations much higher than those found in the enclosed work areas, with the highest concentrations occurring in bucket elevators (100-600 g/m^3). An auxillary study performed to determine if applying additional suction at the boot of a bucket elevator would reduce concentrations resulted in unfavorable results. A third supplemental study conducted before and after cleaning operations and with slower operation of bucket elevators at a facility in Canada showed an absence of high concentrations. The results showed a lower concentration in only one of three tests but an overall absence of high concentrations suggest that slower operation of bucket elevators and previous cleaning are most effective.

Particle size analyses reflecting the size of grain dusts were conducted on samples from each of four elevators, including dusts from equipment, work areas, and static layer samples. Variations in the results occurred between elevators which is probably due to the different grains handled at each facility. The results also indicated that more larger material becomes suspended within bucket elevators as opposed to other equipment and work environments. The larger mass mean diameters are due to the turbulent environments present at the boot and head ends of the bucket elevators. Since these particles are suspended at these points, the dust collection systems will pick up a larger percentage of this material.

4. Question: (b) Dust Control. (vii) Should captured dust be stored away from grain handling facilities? How far away and in what manner?

Answer: Collected grain dust should be removed from handling facilities and stored away from the facility. While storage of pelletized (or otherwise processed) dust would be ideal, bulk storage of raw dust can be achieved safely using techniques which are now current in the grain industry. A recently proposed draft revision of NFPA 61B strongly recommends this practice. The distance from the main facility where dust could be safely stored will have to be determined on a case-by-case basis, but reduced handling and accessibility of transportation are two major concerns which should not be overlooked.

Question: (b) Dust Control. (viii) Should there be a periodic inspection of dust control equipment to detect malfunctioning of the blower and exhaust system? If so, how often? What factors should be considered in such an inspection (e.g., checking the pressure drop across the fabric filter and monitoring the air velocity)? What pressure drop across a fabric filter should be permitted?

Answer: In order for any equipment to function effectively, it must be inspected and maintained at regular intervals. The frequency of inspection and maintenance is extremely variable and depends on first-hand evaluation of many different factors (e.g., loading, design specifications, manufacturer's recommendations, hours of operation, past maintenance, exposure, etc.). These subjects will be addressed in the standards being developed by the NSF/NAS Panel mentioned in the response to question 4(b)(i).

This question addresses an incidental factor rather than going to the heart of the problem. Routinizing the reading of gauges is useless if the meaning of those readings and the ability to respond properly is missing.

Question: (b) Dust Control. (ix) Should gauges on filters and collectors be read and recorded daily? If not daily, then how often?

Answer: Reading and recording the gauge readings on dust collection systems is desirable if such gauges are provided. However, it is more important to have adequately trained operating and maintenance personnel who understand the system, its operating parameters, and the significance of the gauge readings (assuming the system was adequately designed and installed in the first place). The frequency of readings is, as noted in the response to 4(b)(viii), variable.

4. Question: (b) Dust Control. (x) Would a modification of USDA's grading schedules for grain affect the concentrations of dust in the workplace? Could a grading schedule modification result in increased protection for employees?

Answer: It is difficult to visualize how modifications in the grain standards or grading procedures could affect concentrations of dust in employee work areas. Certainly good housekeeping and proper venting would have a direct impact. Movement of grain grading laboratories away from elevators and certain methods of sample conveyance can reduce exposure to dust, but these items are not directly related to grain standards or grading procedures.

Question: (c) Ignition Sources. (i) Do static sparks generated by static electrical charges have enough energy to trigger an explosion in a grain handling facility? If so, what equipment in the facility should be designed to control static electrical charges? Should machinery and mechanical equipment be grounded to electrical system grounds? Should there be a periodic check for electrical ground? If so, how frequent?

Answer: The National Grain and Feed Association should be contacted for information on the subject of electrical charges in dust explosions. They have recently issued contracts to study this problem.

Question: (c) Ignition Sources. (ii) Should grain handling facilities be equipped with lightning and voltage-surge protection? If so, who should be allowed to install such systems?

Answer: Yes, grain handling facilities should be equipped with lightning and voltage-surge protection. The system should be installed according to the appropriate accepted code by certified tradesmen.

Question: (c) Ignition Sources. (iii) What factors and conditions could constitute hazardous areas in grain handling facilities and that should be classified according to the Article 500 of the National Electrical Code (NFPA 70) as Class II, Division I or Division II hazardous locations? Under what conditions should a Division I location be reduced to a Division II location?

Answer: The National Electrical Code is very specific about the basis of designating hazardous locations by Class and Division. Locations where normal operating conditions continuously, intermittently, or periodically produce concentrations of suspended dust at or above the lower explosive limit (concentration) of dust are designated Division I. Locations where normal operating conditions do not continuously, intermittently, or periodically produce concentrations of suspended dust at or above the lower explosive limit (concentration) of dust are designated Division II.

It is recommended that locations where normal operating conditions do not continuously, intermittently, or periodically produce concentrations of suspended dust at or above 25 percent of the lower explosive limit (concentration) of dust be undesignated and regarded as safe from a fire or explosion hazard.

This is similar to the position regarding flammable vapors taken by NFPA 306 which states that locations where flammable vapor concentrations are below 10 percent of the lower explosive limit of the vapor the location is "safe-for-fire" and thus unclassified. The difference between 10 percent of the LEL for vapors and 25 percent of the LEL for dusts recognizes the ease of igniting vapors compared to igniting solid dust particles. In the latter case, additional energy is required to vaporize the solid before ignition can take place.

Obviously, any change of designation between Division I and Division II depends entirely upon the level of dust found or anticipated.

4. Question: (c) Ignition Source. (iv) Should OSHA require the removal of tramp metal from the grain stream to decrease the possibility of fire and explosion due to tramp metal? Where should tramp metal collectors be required? What is the best method of removal? Are grates and screens with mesh of 1-1/2 inches squared acceptable in lieu of magnetic collectors? What should be the maximum allowable time frame for the installation of tramp metal collectors? What is the cost of an installed tramp metal collector?

Answer: Each grain stream moving into a grain handling facility should pass through a scalper or screen or grate having a 1-1/2 x 1-1/2 inch mesh to remove large metal objects, such as scoops, shovels, buckets, cans, and pry bars. Those elevators handling primarily small grains could probably use the latter. This initial separation should be located as near as possible to the point where the grain is dumped from the carrier (truck, railcar, etc.). Because this method will not remove items such as railcar seals, spikes, and smaller metal objects, the grain stream should also be subjected to a magnetic separator. The second separation should also be near the origin of the incoming grain stream. The cost of these devices is about $2,000 per grain stream. Installation of the devices could be made in about a year depending on supplies of the devices and availability of contractors.

Question: (c) Ignition Sources. (v) Should specific smoking areas be designated in grain handling facilities or should smoking be prohibited throughout the facility?

Answer: Smoking should be prohibited in all areas except lounges and lunchrooms designated for employee use, and located away from the working area of the elevator.

Question: (c) Ignition Sources. (vi) Should OSHA require nonsparking buckets on elevator legs? What time frame should be allowed for conversion from metal buckets? How much would this conversion cost?

Answer: The transition away from metal leg buckets is an extremely difficult question at this time. On one hand, metal buckets may strike other metal and cause sparks. On the other hand, many authorities agree that nonmetal buckets generate static electricity and cause sparks. The use of electrically conductive leg belts to control static electricity is somewhat defeated by the

lagging between the belts and their pulleys. This matter must be carefully researched before a firm decision is made. Current thinking is that both types of buckets have inherent and potentially unsatisfactory results.

4. Question: (c) Ignition Sources. (vii) Should the use of self-extinguishing PVC (polyvinyl chloride) belts be required for bucket elevators because of their propensity to soften and melt as opposed to burning? What time frame should be allowed for conversion?

Answer: This may not be an adequate basis for required conversion. Many recent dust explosions have been caused by leg belts parting (whether burned, melted, or torn is incidental) and falling down through the leg casings. In most cases, belting failure results from operator mistakes or poor maintenance or both. Leg belting should be selected on the basis of its appropriateness for a given application. High temperatures in legs are not a normal operating condition. If high temperatures are encountered, both rubber and PVC belting can pose additional hazards.

Question: (c) Ignition Sources. (viii) Under what conditions should employees in grain handling facilities be required to wear static-free clothing and shoes? What is the cost of a set of static-free clothing?

Answer: Several references mention static electricity as a possible cause of grain elevator explosions. However, the references list nongrounded equipment as the source of static electricity. More research is needed to determine the power of a spark necessary to create an explosion before static-free clothing and shoe requirements are made (reference "International Symposium on Grain Elevator Explosions, 1978" and "NFPA Standard for Prevention of Dust Explosions in Flour and Feed Mills, 61C-1971," and "Standard for the Prevention of Fire and Dust Explosions in Grain Elevators and Bulk Grain Handling Facilities, 61B-1970").

Question: (c) Ignition Sources. (ix) What safety precautions should be specified for cutting and welding operations in grain handling facilities? Should a "hot work" permit system be required?

Answer: The ideal situation would be a complete prohibition of welding and hot work inside handling facilities. This eliminates the need to maintain perfect compliance, which due to mistakes in judgment, oversight, or carelessness is virtually impossible over extended periods of time. The next best alternative is the hot work permit system with safety precautions as outlined in NFPA 61B. If welding must be performed, a hot work permit system should be required.

Question: (c) Ignition Sources. (x) Should the operation and construction of grain dryers be as described in Chapter 5 of the latest edition of NFPA Code 61-B, "Grain Elevators, Bulk Handling Facilities?" Should a phase-in period be granted to make the necessary changes? If so, how long?

Answer: The 1980 draft revision of NFPA 61B presents this material more clearly than the older edition. Certain changes are recommended; please see Appendix B. All new dryers should adhere to these fundamental design precepts.

4. Question: (d) Housekeeping and Maintenance. (i) What is the best method of removing dust accumulations?

Answer: The best method of removing accumulated dust at this time is by vacuuming. It should be noted that an even more effective approach is to prevent dust accumulations by (1) retaining dust in the stock handling system, and (2) capturing dust dispersed into the air before it can settle on surfaces.

Question: (d) Housekeeping and Maintenance. (ii) Do present industry practices include employing a separate crew for housekeeping? If not, how does the grain industry manage housekeeping in their facilities? What housekeeping procedure are currently practiced by the industry?

Answer: As pointed out in the USDA report, "Prevention of Dust Explosions in Grain Elevators--An Achievable Goal," housekeeping practices vary considerably.

The remaining sections of 4(d)(ii) are beyond the jurisdiction and experience of USDA.

Question: (d) Housekeeping and Maintenance. (iii) Should removal of dust by the use of compressed air (blow down) be prohibited because of the suspended dust it creates? If not, under what conditions should it be permitted?

Answer: Removing dust from walls, ledges, and otherwise inaccessible locations removes the dust that fuels elevator fires and explosions. In some cases, blowdown by compressed air is the only way available to dislodge dust that cannot be reached by mechanical means. As prescribed by NFPA 61B.19, 1973, blowdown can be carried out safely where all equipment is shut down and sources of ignition removed in the area to be blown down, and all doors and other openings to adjacent operating parts of the elevator are closed.

Question: (d) Housekeeping and Maintenance. (iv) What measures should be included in a written preventive maintenance program?

Answer: We believe OSHA could require elevators to have preventive maintenance programs; however, the details should be left to the individual elevator. This avoids the problems of a prescribed model program that does not fit any facility. The way individual grain elevators operate depends on the construction of the facility, the machinery installed, the nature of the grain handled, and other factors. No two units are entirely similar; therefore, preventive maintenance programs are unique to individual facilities. Please refer to Attachment 2, Self-Evaluation Checklist, devised by the OSC to aid elevator managers in pinpointing problem areas.

Question: (d) Housekeeping and Maintenance. (v) Should there be a periodic shutdown of grain handling operations for maintenance? How often? Should continuous maintenance be required instead? How much down time will be needed for maintenance if there are periodic shutdowns of grain handling operations?

Answer: The necessity for a periodic maintenance shutdown depends on the effectiveness of inhouse preventative maintenance programs and housekeeping efforts. Progressive maintenance programs have the advantage of some scheduling flexibility that periodic programs do not have. We suggest that OSHA should give the elevators the option to choose the method to be used.

4. Question: (d) Housekeeping and Maintenance. (vi) Is there an acceptable level of dust accumulation (layers of dust) in grain handling facilities? For instance, should 1/16 inch be an acceptable level of accumulated dust? Where and how should the level be measured?

Answer: In general terms, if dust accumulations are visible in a facility, the possibility of a potentially destructive explosion exists. Given that existing housekeeping conditions in most grain elevators cannot be expected to entirely prevent such explosions, it is very possible that the best that can be achieved is a reduction of potential losses. If this is the case, then the determination of adequate levels of housekeeping must be determined on a case-by-case basis depending on the presence and effectiveness of other safety measures being used at that location.

Question: (d) Housekeeping and Maintenance. (vii) Should the inside walls of grain elevators be painted to reduce dust adherence? Would the paint provide a surface for static electricity adhesion of dusts? Would dangerous static electricity potentials develop on painted surfaces?

Answer: Painting the inside walls of grain elevators would seem to be a logical and appropriate step in good plant practices. But, in addition to the question of electrostatic adhesion of grain dust to the paint for which there is no specific information, and the question of electricity potentials on painted surfaces to which the paint industry can probably respond, there are also the questions of what impact would painting the innerwall have on the moisture and temperature equilibrium of the grain, would this increase biological hazards, and what safety regulations should be specified on the toxicity of the paint, for which there are no specific answers.

Question: (d) Housekeeping and Maintenance. (viii) Should all grain handling facilities be required to have pneumatic dust control systems? If so, why?

Answer: While pneumatic dust control systems are desirable in many cases, other dust control and, in general, hazard reduction techniques are available. OSHA should not require pneumatic dust control systems in all grain handling facilities. Again, OSHA should concentrate on the development and application of goal-oriented standards rather than specific techniques.

Question: (d) Housekeeping and Maintenance. (ix) What procedures have been established to keep grain handling facilities clear of any decomposed or spoiled grain or processed material?

Answer: Sanitary conditions are required under several laws enforced by USDA agencies, as well as various state agencies. In some cases, FDA may also be involved. Specific techniques are usually left to the discretion of the operator, but brooms, shovels, and wheelbarrows have proved reasonably effective.

5. Question: Grain Dust Exposure. One of the principal occupational health hazards of the grain industry is exposure to grain dust. OSHA requests comments and information on the following: (a) At what level should OSHA set a permissible exposure limit for grain dusts?

Answer: USDA does not have a precise answer to this question, but some observations on establishing a dust standard are offered. The standard should, for example, be based upon both the mechanical injury produced by the dust as well as biological action resulting from the mycology of the grain dusts. There is little epidemiological or toxicological information available regarding grain dusts. However, there have been employee complaints and apparent allergic reactions to grain dusts that need to be considered in establishing a dust standard.

There also does not appear to be a sound basis for using in the grain handling industry the current OSHA permissible exposure level for nuisance aerosols of 15 mg/m^3. This exposure level has been generally applied with the absence of toxicological data to not only grain dust exposures but other dusts. As an illustration of the inappropriateness of the 15 mg/m^3 standard, it should be realized that grain dust is 10 percent as dense as silica. Therefore, a volume of grain dust equaling 15 mg/m^3 presents 10 times the number of particles as a comparable volume of silica. This larger volume of material would certainly produce both upper and lower respiratory distress in excess of what would be acceptable from nuisance aerosols.

Question: Grain Dust Exposure. (b) Should OSHA set permissible exposure limits for total and respirable dust fractions?

Answer: Total dust limits should be set. The problems occur from allergic reactions to dust and possibly to spores of fungi and bacteria. Since nonrespirable dust is often swallowed and soluble nonrespirable dust can be absorbed in body fluids, the standard should be for total dust. Studies by the Office of Safety and Health Management (OSHM), USDA, have shown that most dust is not of the respirable size, yet many pulmonary problems are encountered in elevators.

Question: Grain Dust Exposure. (c) Should OSHA set limits for the different components of grain dust?

Answer: Limits should be set only if there is a proven health hazard from specific components and a methodology exists for field measurement and quantifications.

Question: Grain Dust Exposure. (d) To what extent do the following factors complicate the general assessment of occupational exposure: (1) The seasonal nature of grain handling work activity; (2) the variations in exposure during any given period, and (3) the variability of physical and chemical composition of grain dust.

Answer: Grain workers can have periods of no work and therefore no exposure, but during busy seasons can work much longer than an 8-hour day. Therefore, the 8-hour time weighted average permissible exposure limits may not be a

realistic method of evaluating employee exposure. The work of Dr. John Hickey of North Carolina on handling variations in workshift exposure should be evaluated for application to the grain industry.

For the grain industry, a different daily exposure level may need to be utilized using 10 or more hours, or levels may have to be averaged over a week's time.

Grain dust can vary in its physical size and chemical composition. Grains may contain silica, aflatoxin, pesticides, or allergens.

5. Question: Grain Dust Exposure. (e) To what levels of grain dust are employees of the grain handling industry currently exposed?

Answer: According to USDA and NIOSH sampling results, employees are exposed to respirable dust levels which are usually below the Threshold Limit Value (TLV) of 5 mg/m^3. However, on one occasion, a FGIS employee was exposed to 9 mg/m^3 soybean dust, respirable fraction, during an 8-hour period. Total dust levels, according to a NIOSH study, sometimes greatly exceed the TLV of 15 mg/m^3. Results ranged from .12 mg/m^3 to 131.50 mg/m^3, depending upon job title. FGIS employees do not engage in cleanup procedures which stir up large amounts of dust.

Question: Grain Dust Exposure. (f) Does the practice of returning dust back into the grain stream increase employee exposures to grain dust within the workplace?

Answer: Probably. The problem of returning grain dust to the grain stream can be minimized in an elevator with an adequate dust collection system. However, each collection and return to the stream causes the dust to become drier and drier. This significantly increases its susceptibility to ignition and increases the hazard of a dust explosion.

References conclude that return of dust to stock handling systems usually result in increased dust levels within the facility. If more dust is present in grain, more dust is available to be dispersed. The probability that dust will not be controlled adequately increases proportionately. Reference "Prevention of Explosions--An Achievable Goal," page 39.

Question: Grain Dust Exposure. (g) Are different dust levels generated by different operations? What dust levels are associated with the various operations?

Answer: The exposures of FGIS employees varies with the elevator and with the type of grain, as well as with the location of their jobs. Gallery workers and Rovers are the FGIS employees exposed to the majority of the dust.

Question: Grain Dust Exposure. (h) What kinds of personal protective equipment are used by the industry to reduce employee exposures to grain dust? To what extent is this equipment used?

Answer: FGIS cannot comment on the grain industry practice regarding personal protective equipment or on how extensively it is used. FGIS provides its own employees with hard hats and requires their use. Life vests are provided and required in some special circumstances. Disposable dust respirators are provided for voluntary use. Other personal protective equipment such as gloves and face and eye protection are provided on request, but their use is optional.

5. Question: Grain Dust Exposure. (i) What is the yearly cost for providing personal protective equipment to control dust exposures?

Answer: The price will vary with the type of equipment used. Single-use dust respirators cost approximately $2.00 each, depending upon the brand. Half-mask respirators with dust cartridges cost approximately $3.00 each. Replacement filters cost $2.00 each.

Question: Grain Dust Exposure. (j) What are the standard operating procedures followed by industry for personal protective equipment programs?

Answer: Although documentation has not been compiled, hard hats are generally standard throughout the industry. Dust masks or respirators are often available though not in all cases. At export locations, FGIS found that only 40 percent of the facilities surveyed had instructions pertaining to use of personal protective equipment.

6. Question: Pesticide Exposure. Exposure to pesticides is the second major health hazard found in the grain handling facilities. Work practices and procedures can be designed to limit employee exposure to pesticide-treated grain and can reduce this hazard. OSHA has permissible exposure limits for airborne concentrations of about 160 substances used as pesticides. In addition to these standards, the Environmental Protection Agency has regulations regarding the registration and application of pesticides. OSHA requests comments and information on the following: (a) What kinds and amounts of pesticides are used in grain handling operations? In grain processing?

Answer: The following is a listing of pesticides that may be used for testing seeds. A list of pesticides registered for use on specific kinds of seeds can be obtained from EPA. The grains used for seed are often treated with different chemicals than grains to be used as human or animal food. The more commonly encountered pesticides are reported by seed laboratories to be:

Thiram (tetramethylthiuram disulfide)
Captan (N-Trichloromethylmercapto-4-cyclohexene-1, 2-dicarboximide)
TCMTB (2-Thiocyanomethylthio)benzothiazole)
Malathion (O,O-Dimethyl dithiophosphate of diethyl mercaptosuccinate)
Methoxychlor (P-methoxyphenyl tricloroethane)
PCNB (Penta chloronitrobenzene)
Carboxin (2-3-Dihydro-5-carbozanilido-6-methyl-1, 4-oxathiin)

In addition, methyl mercury compounds are occasionally encountered. Rates of application depend upon the seed kind and the pesticide. These rates may vary from 0.25 to 3.00 ounces of chemical per hundredweight of seed.

The following is a list of pesticides commonly used in grain elevators during handling and/or processing:

Aluminum Phosphide*
Carbon Tetrachloride*
Carbon Disulfide*
Chloropicrin
Ethylene Dibromide
Ethylene Dichloride*
Hydrogen Cyanide
Malathion - contact insecticide*
Methyl Bromide*
Sulphur Dioxide
Sulphuryl Fluoride
Xylene - usually combined with malathion*

*Denotes those chemicals which are widely used. NOTE: Many of these chemicals are used in combination with one another. Also, some of these chemicals are very rarely used in comparison with other chemicals such as those identified above.

USDA has no estimates on the total amounts of these or other pesticides used on grain nationwide.

6. Question: Pesticide Exposure. (b) How are pesticides applied to the grain?

Answer: Methods of pesticide application are explained in detail on the EPA label, labeling, and/or manufacturer's instructions for the individual chemical.

Question: Pesticide Exposure. (c) At what stages of grain handling are pesticides applied to the grain (e.g., unloading, loading, storage, moving through elevators, etc.)?

Answer: Pesticides are applied to grain to either prevent infestation or to control insect infestation that is already present. Therefore, pesticides may be applied to the grain from shortly after harvest up to and including final processing and storage.

Question: Pesticide Exposure. (d) Most of the chemicals listed in 6(a) are restricted use pesticides and as such contain specific wording on the labels, labeling, and/or manufacturer's instructions. For specific information, it is advisable to consult the specific chemical's label, labeling, and/or manufacturer's instructions.

Question: Pesticide Exposure. (e) Is grain often treated with pesticides before it arrives at the grain handling facilities? Do railcars and trucks containing pesticide-treated grain carry signs and placards that adequately warn of pesticide hazards?

Answer: Grain is treated with pesticides prior to arrival at grain handling facilities. A few pesticides, such as aluminum phosphide, carbon tetrachloride/carbon disulfide mixtures, are allowed to be used in transit on railcars. If fumigants are used in transit, the Department of Transportation requires that railcars under fumigation carry placards warning of the potential danger. However, many times cars arrive at a handling facility under fumigation and without placards. Reasons for this range from placards falling off during transit, but perhaps a more likely reason is that the shipper did not attach the placard to the car for fear of advertising the possibility of an infestation problem to the receiver of the shipment.

Samples tested in seed laboratories often have been treated with pesticides prior to arrival. The samples do not carry labeling or a warning that the seed is treated. Some grains are colored in compliance with Food and Drug requirements to indicate that the seeds are treated.

6. Question: Pesticide Exposure. (f) What procedures and work practices are used to prevent employee exposures to pesticides when employees unload incoming grain, enter bins, hopper cars, or other confined spaces, or work in facilities that handle pesticide-treated grain?

Answer: Facilities that handle pesticide-treated grain include seed testing laboratories. Work practices include use of exhaust hoods, separate space for testing, face masks, rubber gloves, and plastic bags for handling and storing samples.

If FGIS employees suspect that a hazardous condition exists due to fumigant or pesticide concentration, the request for inspection service is denied until the situation has been determined to be safe by a marine chemist or other qualified individual.

Question: Pesticide Exposure. (g) What type of testing is currently performed to measure pesticide exposure levels prior to unloading the grain and before entering hopper cars, bins, or other confined spaces? Besides testing for pesticides, are oxygen deficiency tests performed?

Answer: FGIS is just starting to investigate this problem. However, FGIS relies heavily on the expertise of a certified marine chemist to ensure our employee's safety prior to personnel entering empty or partially loaded shipholds after treatment with a pesticide. In general, a marine chemist will test for explosibility, oxygen content, and pesticide concentration in the air.

Question: Pesticide Exposure. (h) What procedures and work practices are currently used to prevent employee exposures to pesticides during fumigation operations?

Answer: In general, FGIS employees must evacuate the area being fumigated. However, in the case of malathion application or fumigants being applied immediately before or directly to grain entering into bins, etc., FGIS employees are permitted to work in these areas provided there is no hazard to their safety.

6. Question: Pesticide Exposure. (i) To what extent does the industry use personal protective equipment to protect employees from pesticide exposure? During what procedures?

Answer: Masks and gloves are worn during testing of samples in AMS seed laboratories. USDA does not perform fumigation in elevators.

Question: Pesticide Exposure. (j) What types of protective equipment are used to protect applicators of pesticides from pesticide hazards?

Answer: We do not have that information.

Question: Pesticide Exposure. (k) What types of protective equipment are used to protect nonapplicators of pesticides from the hazards of pesticide exposure?

Answer: No protective equipment for pesticides is issued by FGIS to its employees. However, if a hazardous condition is suspected, a marine chemist or other qualified individual is asked to make a determination of the condition.

Question: Pesticide Exposure. (l) What personal protective equipment is used when employees probe or grade the grain?

Answer: FGIS employees are issued gloves, hard hats, dust masks, etc. However, no personal protective equipment is provided specifically for pesticide hazards.

Question: Pesticide Exposure (m) What is the cost per employee to provide him with personal protective equipment for pesticide protection?

Answer: Cost would be less than $50.00 per person per year.

Question: Pesticide Exposure. (n) What health effects and symptoms have employees suffered upon exposures to pesticides?

Answer: Health effects and symptoms vary with the individual and the pesticide. Some individuals report no problems with pesticides. Others report suffering from skin rashes, itching, sneezing, runny nose, and eye irritation. Some pesticides encountered have produced headaches upon exposure to the fumes.

Question: Pesticide Exposure. (o) To what extent will protective measures to control exposures to grain dust also protect against pesticide exposure?

Answer: Due to the variables controlling pesticide residue levels in dust, the full extent of any potential hazard remains to be determined. Certainly the reduction of dust should lessen the exposure of workers to insecticide residues.

Grain dust does carry pesticide residues as well as other potentially harmful substances such as mycotoxins. Further, exposure to grain dust in itself is not healthful. Obviously, any measures to control employee exposure to grain dust and its components will be beneficial.

7. Question: Biological Agents Associated With Grain Dust. (a) How should exposures to molds, fungi, bacteria, and toxins be regulated?

Answer: Too little is presently known about these problems to set up a standard. More study is needed.

Question: Biological Agents Associated With Grain Dust. (b) If dust emissions are controlled, will biological agents be controlled as well?

Answer: It would seem logical that if the concentration of respirable dust is reduced below that which is of physiological significance that the level of exposure to biological agents which may contaminate the dust would be controlled as well. This statement assumes that the physiological activity of the contaminant is no greater than that of the dust. This fact may or may not be true. Evidence to support either position is not available.

Question: Biological Agents Associated With Grain Dust. (c) Do decaying grains which have not been removed from work surfaces create additional biological hazards?

Answer: The degree to which decaying grains which have not been removed from work surfaces create additional biological hazards would depend upon the humidity and temperature of the environment, the moisture content and composition of the decaying material, the organisms producing the decay, the degree to which the material is disturbed and subsequently contributes to the level of respirable dust and the exposure time of the employee. Each of these items is a factor in the degree and scope to which any additional biological hazards are created.

8. Question: Surveillance Procedures and Other Work Practices. A comprehensive regulation to control employee exposures to occupational hazards in grain handling facilities would include work practices and procedures, precautions for safe use, exposure monitoring, and other provisions to ensure employee protection. OSHA requests comments and information on the following: (a) To what extent does the grain industry monitor grain handling facilities for employee dust exposure?

Answer: USDA has no specific knowledge of the practices followed by the grain industry. USDA monitors exposure of Federal Grain Inspectors at selected elevators.

Question: Surveillance Procedures and Other Work Practices. (b) To what extent does the grain industry monitor grain handling facilities for employee pesticide exposure?

Answer: USDA has no specific knowledge of the practices followed by the grain industry. USDA monitors exposure of Federal Grain Inspectors at selected elevators.

Question: Surveillance Procedures and Other Work Practices. (c) To what extent does the grain industry monitor grain handling facilities for employee exposures to other chemicals or substances used in grain processing?

Answer: USDA has no specific knowledge of the practices followed by the grain industry.

8. Question: Surveillance Procedures and Other Work Practices. (d) How often is monitoring done?

Answer: Medical monitoring is not routinely performed on USDA employees. USDA has no knowledge of medical monitoring performed on industry employees.

Question: Surveillance Procedures and Other Work Practices. (e) What type of medical surveillance programs have been instituted by the industry?

Answer: FGIS presently has no medical surveillance. Potential employees must have a physical before taking the job. No specific tests are mentioned. USDA has no specific knowledge of industry medical surveillance practices.

Question: Surveillance Procedures and Other Work Practices. (f) What specific medical tests are performed to evaluate the health of the grain handlers?

Answer: No medical tests are routinely performed on USDA employees.

Question: Surveillance Procedures and Other Work Practices. (g) Should grain handlers be given pulmonary function tests and skin sensitivity tests? If so, how often?

Answer: Pulmonary function tests could be given annually or every other year. Allergy tests can become complicated and do not always reflect respiratory allergies. Cholinesterase tests should be performed on employees exposed to organic phosphate pesticides. More extensive medical surveillance may be necessary.

Question: Surveillance Procedures and Other Work Practices. (h) What personal protective equipment is used by employees cleaning up dust, grain, or spilled pesticides?

Answer: This varies from facility to facility. USDA employees do not perform cleanup activities.

Question: Surveillance Procedures and Other Work Practices. (i) What general hygiene practices are followed by the industry?

Answer: This question pertains to practices in the grain industry and USDA cannot offer comment.

9. Question: Employee Training. (a) How often and to what extent should employees handling grain be trained in recognizing safety and health hazards? What elements should be included in the training?

Answer: Operating a grain handling facility in a safe and healthful manner rests, to a large extent, on alert employees who are trained to recognize hazards and respond appropriately. The employee must be an integral part of the overall risk management program.

In broad terms, employee training should address three areas: safe work practices, hazard recognition, and appropriate response procedures. A continuing reaffirmation of management concern and safety consciousness promotes a like-minded attitude among employees. Regular, topical plant safety meetings in conjunction with adequate training of new employees are the simplest means of achieving this end. The frequency and extent of employee training depends on the size of the facility and the number of employees, as well as other factors.

9. Question: Employee Training. (b) What specific training should be given in the use of personal protective equipment and clothing? How often?

Answer: Employees should be trained in the use of personal protective equipment including:

(1) Why the equipment should be used.
(2) When the equipment should be used.
(3) How the equipment should be used (including limitations).
(4) Proper maintenance and care of the equipment.

The frequency of this training depends on the employee.

Question: Employee Training. (c) How often should safety and health meetings be conducted?

Answer: The frequency of safety and health meetings will vary, but they should be held at least once per month.

10. Question: Fire Protection and Means of Emergency Escape. (a) Should there be periodic fire drills in grain handling facilities? How often?

Answer: Fires are extremely common in grain handling facilities and all facilities should hold periodic fire drills. Frequency of these drills will vary from facility to facility but in most cases one drill per month should prove more than adequate.

Question: Fire Protection and Means of Emergency Escape. (b) Should a standpipe and hose system be required in grain handling facilities? Where should it be located?

Answer: An appendix to the current draft revision of NFPA 61B recommends either sprinkler or, where water supplies are inadequate, a dry standpipe. A hose installation is less desirable because of deterioration and theft problems. Standpipes should be located in headhouses with appropriate connections in galleries and tunnels.

Question: Fire Protection and Means of Emergency Escape. (c) Should OSHA require the use of a fire alarm system in grain handling facilities?

Answer: Fire alarm systems with backup power supplies should be provided in all grain handling facilities. This should be required by OSHA.

10. Question: Fire Protection and Means of Emergency Escape. (d) Should employees attempt to fight incipient fires in grain handling facilities? If so, under what conditions?

Answer: Adequate employee response to smoldering fires is a vital part of plant protection. Often, the proper firefighting response can avert major damage. Employees should attempt to extinguish smoldering fires if adequately trained.

10. Question: Fire Protection and Means of Emergency Escape. (e) Should emergency lighting be required in grain handling facilities?

Answer: Emergency lighting can be useful in certain situations, but should not be required.

Question: Fire Protection and Means of Emergency Escape. (f) Should OSHA recognize special means of emergency escape from grain handling facilities? For example, should ladders be an acceptable means of emergency escape from the tops of silos, galleries, and headhouses?

Answer: Outside ladders designed in accordance with 29 CFR 1910.27 should be recognized as an acceptable means of emergency escape.

11. Question: Economic and Environmental Impact. (a) What would be the economic impact of a regulation to control employee exposure to the health hazards in grain handling facilities? What benefits would result from such a regulation?

Answer: The major health hazards in grain handling facilities include the effects of employee exposure to grain dust and toxic chemicals or vapors. Specific standards may employ several different methods to minimize exposure to the health hazards, and range from doing little or nothing additional to current practices to (1) removing the dust particles or chemicals from the air mechanically and/or chemically to improve air quality, and (2) utilizing protective clothing and filtering devices to prevent the dust and chemicals from entering the lungs and contacting the skin.

The economic impact of new standards on grain handling facilities will depend on which types are considered. Workers could be required to wear dust masks and other personal protective equipment and clothing to minimize exposure to the health hazards in grain handling facilities. The installation of dust control systems may not adversely affect the economic operations of large grain handling facilities like corn wet milling, port terminal elevators, and soybean processors. However, other segments of the industry like country elevators and feed mills, which have a large number of small firms, will be affected structurally because they are less likely to have the necessary capital to install dust control systems. Other segments of the industry may be able to pass their increased operating costs on to the ultimate consumer in the form of higher prices rather than absorb them. Thus, economic pressures for industry concentration or price rises could increase.

Since grain storage and handling systems existing in the United States have developed over a long period of time, there is great variability in the age, physical configuration, size, type of grain handling equipment, and impact on the surrounding community. Some are small operations. Some operate in sparsely populated areas. Some are privately owned; others are partnerships, cooperatives, or corporations. Some operate only a few days during a year in order to serve as a reservoir for timely harvest. Others operate 20-24 hours per day, 6-7 days per week. Some operations are the prime source of economic activity for the owners; others are a minor part of the multifaceted conglomerate. Some operations are the primary off-farm economic activity for the community. Thus, estimating the impacts of restructuring the grain storage and handling industry is a complex problem.

Benefits from regulations to control employee exposure to the health hazards may include a reduction in lung, nose, throat, and eye-related health problems; a reduction in the potential for dust explosions; improved grain quality; cleaner air; and a potential monetary gain from the dust collected for example, from its use as livestock feed.

11. Regulations and standards which attempt to improve the safety and health of employees of grain handling facilities should consider the economic and environmental impacts on the industries affected, including farmers. Such regulations could affect hundreds of thousands of workers in about 15,000 facilities throughout the United States. These facilities include export, terminal, and country grain elevators; grain and flour millers; feed processors; grain and rice drying facilities; soybean and corn oil processors; cereal manufacturers; grain alcohol distillers; processors of bakery and confection products; and even farmers who operate their own grain drying and storage facilities.

The impacts are highly uncertain at this time due to the discretionary nature, broad scope, and general direction of the authorizing legislation. Specific options need to be defined in order to provide a focus to the estimates of the quantitative impacts on the affected industries. The limited availability of technical information and data on many aspects of the safety and health issues involved will compound the difficulty of addressing the potential impacts. Meaningful cost estimates should take account of the wide variation among the types of grain handling facilities and in the physical operating structure of any given facility. With the present state of problem definition and information availability, only general comments can be made on the type of analysis needed for each alternative course of action that could be imposed on the grain industry. A suggested framework for gaining an understanding of the scope of the problem and to serve as a basis for an impact assessment is:

A. Industry setting - What are the numbers, sizes, locations, types of operation, age distribution of plants, ownership patterns, number of employees, importance of susceptibility to health and safety hazards?

B. Financial characteristics - What are the fixed costs, variable costs, wage bill, price bargaining situations, profitability, and capital investment potentials?

C. Options - What are the possibilities for personal equipment, controlled environment, training, considerations for size and age of operation, differences for urban vs. rural locations, and other factors concerning immediate surrounding conditions?

D. Impact analysis - What could be the comparative personal health and safety benefits, insurance costs, personnel costs, firm costs, product prices, profitability, potential bankruptcy, employment, international trade, productivity, and community considerations?

11. Question: Economic and Environmental Impact. (b) What would be the economic impact of a regulation to prevent fires and explosions in grain handling facilities? What benefits would result from such a regulation?

Answer: The cost impact on the industry of whatever is imposed via regulations will be the sum of the impacts on the individual members, among whom the impacts will vary widely. For example, a 1972 study estimated the cost of installing a comprehensive dust collection system at an export port elevator to be as high as $.75 million. Today's estimate would easily exceed a million dollars, but likely would translate into only a few cents per bushel of grain handled annually. Unfortunately, this study is the most recent available and its estimates are obviously obsolete for decision purposes, but it provides a framework for analysis.

Some systems, like a comprehensive dust control system, have high annual maintenance costs, as well as high initial capital investment costs. Regulations specifying structural designs and materials can represent substantial capital investments by grain industry members.

Important questions, unanswered at this time, include: (1) Are there alternative grain dust regulations which require specifically designed systems? (2) Which grain handling facilities would be required to install such systems? (3) How would such a requirement impact each type of facility with respect to facility size? Smaller firms may conceivably be forced out of business. (4) Would particular types of dust control systems be more effective if they were tailored to specific types of grain handling facilities; e.g., a country vs an export elevator, an export elevator vs a flour mill, etc.? (5) What are the effects of any Federal tax incentives, like an investment credit, offered to the grain industry to ease the impact? (6) What are the effects of alternative time frames for compliance? This flexibility might assist planned facility remodeling and be able to incorporate new structural designs conducive to minimizing the occurrence of fires, but particularly explosions? (7) What is the potential for performance regulations instead of engineering design regulations? (8) What are the personal costs to employees? Are there examples of other industries where employees supply their personal protective equipment?

Similar questions would apply to other possible requirements of potential legislation. Many conceivable requirements would have only a minimal cost impact, either because the industry would already be in compliance or because the compliance cost is low. Examples include caged light fixtures; the presence of fire extinguishers; the encasement in conduit of electrical wiring; the wearing of dust masks; the removal of all flammable materials; the installation of overload indicators, automatic shutoffs, and ammeters; and the prohibition of smoking and welding, except in designated areas of under specified conditions.

The benefits accruing from potential safety regulations can be expected to vary widely. Measurement of the benefits is considerably more difficult than of costs, particularly because of the effect it has on human [illegible].

Examples of benefits that may accrue include: (1) reductions, possibly substantial, in the loss of life and property and in bodily injury, (2) improvements in air quality and possibly in employee morale, attributable to a safer and healthier work environment. Consequently, insurance rates should be less than would otherwise occur. Such estimates do not exist and need to be developed before a decision on the appropriate degree of regulation is made.

11. Question: Economic and Environmental Impact. (c) What would be the environmental impact of regulating the safety and health hazards in grain handling facilities?

Air pollution associated with most of the grain handling facilities' operations can be reduced to very low levels with the technology available today. Regulation requirements can bring this about, but maybe only at a very high cost, particularly relative to the benefits to be realized. The incentives for minimizing atmospheric emissions include reducing fire, explosion, and general health hazards. The benefits need to be valued in any environmental impact cost-benefit analysis. Such an analysis should consider: (1) ambient environmental conditions, (2) effects of within-facility vs surrounding facility conditions, (3) population densities, and (4) extent of control on other industrial pollutions.

11. Question: Economic and Environmental Impact. (d) What are the current costs of maintaining the safety and health of employees in grain handling facilities?

Answer: Current information of this nature is limited. Obtaining current costs would likely necessitate surveying a sample of the different types of grain handling facilities in the U.S. to determine their methods of maintaining the employees' safety and health. However, some indications of the magnitude may be obtained from examining the reported costs of installing pollution control systems in the early 1970's.

Based on a 1978 dust survey, the Office of the Special Coordinator for Grain Elevator Safety and Security found that all of the 67 export elevators that responded to the survey were using mechanical dust collection equipment in their programs of dust control. The number of dust collectors installed in these facilities ranged from 1 to 125. Forty-nine percent had installed 9 or more collectors. This response compares to Scheinbein's and Vosloh's study in which 28 percent of the respondents had an active dust control program in progress by 1972 and 20 percent had a dust control program in the planning stage.

In the early 1970's, 18 inland terminals had dust control program costs (capital and operating) ranging from $20,000 to $320,000, and 15 port terminals had dust control expenditures ranging from $40,000 to $525,000. Eleven port facilities planned programs for 1973 ranging in cost from $50,000 to $750,000. The extent to which improvements in system design equipment effectiveness or methods of dealing with the problem offset the cost increases of the past decade are unknown. However, Scheinbein's and Vosloh's study provides a framework for updating the analysis.

Another early 1970's study by Midwest Research Institute using plant financial models indicated the investment cost for the best demonstrated control system to range from $54,800 for alfalfa dehydrators to almost $872,000 for corn wet milling facilities, with annual control costs ranging from $12,570 to $277,090, respectively.

11. These studies are only indications of the types and sizes of costs which faced the industry nearly 10 years ago. They may provide a benchmark for comparison and a framework for updating the analyses. But, the data are obsolete with regard to the decisions to be made and the research needs to be redone. Such research could examine the cost and effectiveness of employee training sessions, equipment costs to monitor unsafe conditions, effectiveness of halting operations when critical conditions exist, cost of fire protection, safety stations and safety equipment, and consequences of eliminating re-entry of grain dust to the grain stream.

12. Question: Miscellaneous. OSHA requests comments and information on the following related topics: (a) Should the health hazards found in grain handling facilities be addressed in a separate health standard or combined with safety standard provisions to form a comprehensive standard for grain handling facilities?

Answer: In order to avoid duplication and confusion and to reduce the costs of enforcement and compliance, health and safety should be combined in a single standard for grain handling facilities. If a separate standard for grain handling facilities must be devised, health and safety should be addressed as one standard. However, many aspects of grain handling facilities are covered by OSHA and EPA regulations, and by NFPA standards. In many cases, these regulations are sufficient.

Question: Miscellaneous. (b) Should the health hazard regulations be three separate standards specific for grain dust, pesticides, and biological agents?

Answer: USDA prefers one standard with separate subsections. Pesticides are presently regulated by OSHA in 29 CFR 1910.1000. Biological agents need more research before a standard can be set. Grain dust does need a separate standard, possibly included in a standard for all organic dusts.

Question: Miscellaneous. (c) Should OSHA regulate the safety hazards in performance or goal-oriented standards which would be designed to provide more flexible compliance practices? How could this be achieved?

Answer: OSHA should concentrate on application and enforcement of goal-oriented standards rather than a list of specific, mandated methods. Regulations geared to methodology preclude technological and managerial innovation. However, engineering and administrative controls to protect workers' health should be stressed above personal protective equipment.

This could be achieved by monitoring the safety and health experience of the industry as a whole and applying specific enforcement measures to individual facilities having less than adequate results.

Question: Miscellaneous. (d) What test methods and certification criteria are necessary for personal protective equipment to be used in grain handling facilities?

Answer: The NIOSH tests and approval for personal protective equipment seems to be adequate at this time.

12. Question: Miscellaneous. (e) Are currently available personal protective equipment and clothing effective and suitable for conditions found in grain handling facilities or is additional research necessary?

Answer: FGIS has an interest in personal protective equipment used in the grain industry. Our employees are required to wear hard hats and we find present models are adequate. Disposable dust respirators are provided for voluntary use. These are believed to be effective and suitable. Other items are provided as requested. These items include gloves, goggles, hearing protection, etc. We do not believe special wearing apparel is necessary for protection from grain and grain dust. However, we provide orange coveralls for our employees during ship stowage examinations.

Question: Miscellaneous. (f) What machine guards are necessary for grinding and milling operations, conveyor equipment, and related machinery in grain handling and processing facilities? What types of machine guards have been found to be effective and why?

Answer: The problems of guarding operating and conveying equipment in a grain facility is beyond the scope of USDA.

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SAFETY-OPERATIONS PLANS

A Self-Evaluation Checklist for

Grain Elevators

Office of the Special Coordinator for
Grain Elevator Safety and Security

U.S. Department of Agriculture

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Self-Evaluation Checklist
Safety-Operations Plans
Grain Handling Facilities

The broad term "safety-operations plans" includes five specific program areas, all of which must be addressed if grain handling facilities are to achieve and maintain safe and healthful working conditions. These are safety, emergency preparedness, housekeeping, maintenance, and security. Attention and effort must be directed to a functional and continuing plan of action in each of these areas. Failing to achieve an adequate level of performance in any one of the areas can result in accidents which, at very least, disrupt the ability to achieve management and operating goals.

Many grain handling accidents, from a cut finger to a catastrophic dust explosion, result from simple mistakes...either mistakes in performing ordinary tasks or mistakes in judgment. Mistakes can be prevented. This prevents accidents and results in a facility which functions smoothly and safely.

Preventing accidents by preventing mistakes is not an achievement obtained without some cost. It involves such varied factors as management/employee attitudes and relationships, facility design, types of grain or products handled, and age of equipment. The chief requirement is attention to detail. This means knowing what to do and how and when to do it. This takes forethought and planning...a concise set of standard operating procedures for each of the five program areas already mentioned.

Having a set of standard operating procedures in a particular program, maintenance for instance, normally requires some sort of written instructions. However a system of oral instructions can be adequate, and even desirable, under certain circumstances. Depending on the situation in a particular facility, this will vary. How extensive a program should be and how rigorously it is implemented also will vary depending on the facility. Ultimately, these are management decisions.

The following checklists are guides for managers of grain handling facilities to use in assessing the adequacy of safety-oriented efforts in their individual facilities. This material is designed to help managers develop and implement adequate, effective work programs geared to safe and efficient grain handling. In general, the greater the number of questions having a check in the "no" column (or box), the greater the need to improve existing procedures and instructions in order to achieve currently accepted standards of safe, effective operations. As stated previously, what parts and how much of this guide should be put into practice are management decisions depending on the situation in an individual facility.

SAFETY PROGRAM

A safety program is a means of preventing accidents including fires and explosions. It is also one means of dealing with and resolving known safety hazards and problems which arise from time-to-time. Good safety programming must recognize the valuable contribution of employees in achieving and maintaining safe and healthful working conditions. In this respect, training and the dissemination of information is vitally important.

		YES	NO
1.	Has the facility developed and implemented a safety program?..	/_/	/_/
2.	Is the program and its objectives clearly stated in a written plan?.....	/_/	/_/
3.	Is some person in the facility responsible for seeing that the safety program is implemented?.....	/_/	/_/
4.	Does the facility have a functioning safety committee?.....	/_/	/_/
5.	Does membership of this committee include all employees?.....	/_/	/_/
6.	Do all employees attend committee meetings?.....	/_/	/_/
7.	Do outside contractors attend and participate in these meetings?.....	/_/	/_/
8.	Are all employees and contractors notified of committee decisions and recommendations?.....	/_/	/_/
9.	Does the committee meet: (Check "yes" to one only)		
	Biweekly?.....	/_/	/_/
	Monthly?.....	/_/	/_/
	Bimonthly?.....	/_/	/_/
	Other (specify) _____		
10.	Are regular plant safety inspections performed by the safety committee?.....	/_/	/_/
11.	Does management accompany the committee on these inspections?.	/_/	/_/
12.	Are there correction and followup procedures for hazardous conditions noted on these inspections?.....	/_/	/_/
13.	Are new employees briefed or orally instructed in safety and what they must do to maintain a safe facility?.....	/_/	/_/
14.	Is a safety handbook or checklist issued to new employees?....	/_/	/_/

		YES	NO
15.	Are employee work activities periodically analyzed to ensure that jobs are being performed as safely as possible?.....	/_/	/_/
16.	Are employees periodically instructed in work techniques which help to promote safety?.....	/_/	/_/
17.	Are outside contractors and their employees briefed and given copies of safety instructions?.....	/_/	/_/
18.	Does facility management check to make sure that contractors and their employees are following these safety instructions?..	/_/	/_/
19.	Do safety briefings for new employees and contractors cover:		
	Proper clothing?.....	/_/	/_/
	Use of safety devices?.....	/_/	/_/
	Safe work procedures (do's and don'ts)?.....	/_/	/_/
	Procedures requiring permits or special permission?.....	/_/	/_/
	Other (specify) _____		
20.	Are there permit requirements and procedures for:		
	Welding and hot work?.....	/_/	/_/
	Equipment lockout?.....	/_/	/_/
	Bin or tank entry?.....	/_/	/_/
	Choked legs?.....	/_/	/_/
	Fumigation?.....	/_/	/_/
	Vessel or rail car entry?.....	/_/	/_/
	Other (specify) _____		
21.	Are employees provided with personal safety equipment?.....	/_/	/_/
22.	Are employees instructed in maintenance and use of this equipment?.....	/_/	/_/
23.	Is a location chart for gas masks readily available for all personnel?.....	/_/	/_/
24.	Are gas masks located on each floor of the elevator?.....	/_/	/_/
25.	Is a location chart for self-contained breathing devices available to all personnel?.....	/_/	/_/

		YES	NO
26.	Are dust masks readily available?.....	☐	☐
27.	Is use of personal safety equipment strictly enforced?.....	☐	☐
28.	Are employees given first aid training?.....	☐	☐
29.	Is there at least one person with first aid training on each shift?.....	☐	☐
30.	Is the location of all first aid kits known to all personnel?.	☐	☐
31.	Are first aid kits located on each floor of the facility and in all major areas?.....	☐	☐
32.	Does the facility have an accident reporting system?.....	☐	☐
33.	Are serious accidents investigated?.....	☐	☐
34.	Does the facility have a procedure for collecting and evaluating employee suggestions about how to improve safety?.....	☐	☐
35.	Are incentives offered for suggestions which are used?.....	☐	☐
36.	Are there procedures for putting acceptable suggestions into practice?.....	☐	☐
37.	Are employees trained to recognize and react to hazard situations?.....	☐	☐
38.	Are primary emergency exits clearly marked?.....	☐	☐
39.	Are alternative exits clearly marked and known to all personnel?.....	☐	☐
40.	Are employees fully aware of possible fire and explosion hazards in elevators?.....	☐	☐

EMERGENCY PREPAREDNESS PROGRAM

Developing and being in a position to carry-out various emergency procedures if an accident should occur is good common sense. No one can anticipate and prevent every accident. An effective emergency preparedness program will permit the facility to save lives, reduce injuries, and minimize property losses when emergencies occur.

	YES	NO
1. Has the facility developed and implemented a written emergency preparedness program?.....	☐	☐
2. Does the program specify responsibilities in emergency situations for:		
Designated management officials?.....	☐	☐
Supervisors?.....	☐	☐
Employees?.....	☐	☐
3. Has a responsible person been assigned to ensure that emergency provisions can be carried out?.....	☐	☐
4. Is a responsible official on duty at the facility at all times during operations?.....	☐	☐
5. Does this person have the necessary authority to halt operations and initiate emergency procedures?.....	☐	☐
6. Does this authority include employee and contractor evacuation?.....	☐	☐
7. Are there specific emergency instructions and procedures for:		
Fires?.....	☐	☐
Dust explosions?.....	☐	☐
Bomb threats?.....	☐	☐
Tornadoes and hurricanes?.....	☐	☐
Release of toxic chemicals?.....	☐	☐
Equipment or electrical malfunction?.....	☐	☐
Personal injury or sickness?.....	☐	☐
Civil disorders?.....	☐	☐
Other (specify) _____		

		YES	NO
8.	Are there regular drills and training in each emergency procedure?.....	☐	☐
9.	Are there instructions which specify procedures for equipment shutdown in an emergency?.....	☐	☐
10.	Do all persons in the facility know the locations of primary and alternative exits in all major areas?.....	☐	☐
11.	Can areas of the facility be isolated to contain emergency situations?.....	☐	☐
12.	Is the facility equipped with alarms, intercoms, telephones, etc., to notify persons in the facility that an emergency exists?.....	☐	☐
13.	Are there back-up communication systems?.....	☐	☐
	With separate power supplies?.....	☐	☐
14.	When persons are evacuated from the facility, have safe areas been designated?.....	☐	☐
15.	Is there some means of determining that all persons are out of the facility (i.e. buddy system, head count, etc.)?.....	☐	☐
16.	Does the program specify exactly who determines when an emergency has been abated and operations can resume?.....	☐	☐
17.	Does the program provide for prompt notification of appropriate Federal, State, and local authorities?.....	☐	☐
18.	Does this include:		
	Police or sheriff?.....	☐	☐
	Fire department?.....	☐	☐
	Civil defense?.....	☐	☐
	Hospitals?.....	☐	☐
	Port authorities?.....	☐	☐
	Coast Guard officials?.....	☐	☐
	OSHA?.....	☐	☐
	USDA?.....	☐	☐
	FDA?.....	☐	☐

	YES	NO
Insurance companies?.....	/_/	/_/
Ship captains?.....	/_/	/_/
Other (specify) _____		
19. Has it been clearly defined exactly which authority has overall responsibility for directing and coordinating emergency procedures?.....	/_/	/_/
20. Have the appropriate authorities helped to develop emergency procedures?.....	/_/	/_/
21. Does the program specify a company official who is responsible for coordinating development and implementation of the emergency preparedness program with appropriate Federal, State, and local authorities? (See No. 18.).....	/_/	/_/
22. Does the program specify exactly what emergency equipment and resources are available:		
Inhouse?.....	/_/	/_/
Outside?.....	/_/	/_/
23. Are equipment and resources adequate?.....	/_/	/_/
24. Are location charts for emergency equipment available to all personnel:		
Fire extinguishers?.....	/_/	/_/
Alarm boxes?.....	/_/	/_/
Gas masks?.....	/_/	/_/
Self-contained devices/dust masks?.....	/_/	/_/
Fire hoses?.....	/_/	/_/
First aid kits?.....	/_/	/_/
Sprinkler systems?.....	/_/	/_/
25. Is this equipment readily accessible to all work locations?.....	/_/	/_/
26. Are employees trained to use this equipment?.....	/_/	/_/

		YES	NO
27.	Are appropriate types of fire extinguishers placed at or near hazard locations?.....	☐	☐
28.	Are fire extinguishers marked to show the types of fires for which they should be used?.....	☐	☐
29.	Are extinguisher locations designated by signs or other markings if located in an area of visual obstruction?.....	☐	☐
30.	Do sprinkler controls have a sign showing how they are to be used?.....	☐	☐
31.	Has a functional, dry standpipe been installed in the facility?	☐	☐
32.	Are hose and pumper couplings clearly marked?.....	☐	☐
33.	Are all alarm boxes located in the normal path of exit travel?	☐	☐
34.	Are alarm boxes readily visible and well marked?.....	☐	☐
35.	Does the facility have a fire brigade?.....	☐	☐
36.	If so, is the brigade trained?.....	☐	☐

HOUSEKEEPING PROGRAM

Housekeeping activities should be scheduled and carried out so as to prevent the accumulation of potentially dangerous materials such as grain spills, dust, oily wastes, rubbish, and other debris or unused equipment and material. An effective housekeeping program can achieve not only reduced amounts of fuel available for fires and explosions, but also a reduction of slip/fall hazards, reduced insect and rodent infestation and damage, and improved employee morale because of generally improved working conditions.

In those facilities where pneumatic dust control systems are installed and operated, the need for housekeeping may be reduced. However, it can not be entirely eliminated. Housekeeping should be performed regularly based on regular evaluation of individual areas within the facility. The need for housekeeping, both "how often" and "how much" will vary with each area. Housekeeping programs should provide for safe and rapid disposal of collected material.

	YES	NO
1. Has the facility developed and implemented a written housekeeping program?.....	/__/	/__/
2. Does the program include inspection checklists/schedules?.....	/__/	/__/
3. Does the program specify housekeeping responsibilities for:		
Designated management official(s)?.....	/__/	/__/
Individual employees and shifts?.....	/__/	/__/
Major areas within the facility?.....	/__/	/__/
4. Are housekeeping standards clearly specified?.....	/__/	/__/
5. Are these standards defined in terms of:		
Accumulated dust levels?.....	/__/	/__/
Airborne dust concentrations (operational level of dust control systems)?.....	/__/	/__/
Spill levels?.....	/__/	/__/
Dust system malfunction or shutdown?.....	/__/	/__/
Accumulations of debris or trash?.....	/__/	/__/
General cleanup?.....	/__/	/__/
Other (oil/water spills,etc.)?.....	/__/	/__/
6. Are these standards enforced by using:		
Inspections?.....	/__/	/__/

	YES	NO
Followup inspections?	☐	☐
Other supervision methods?	☐	☐
7. Are there specific instruction on when, where, and how to perform:		
Vacuuming?	☐	☐
Compressed air blowdown?	☐	☐
Washdowns?	☐	☐
Manual cleaning? (Sweeping and shoveling)	☐	☐
8. Can the plant be shutdown (or a specific area isolated) for housekeeping when necessary?	☐	☐
9. Is plant shutdown (or area isolation) for housekeeping done periodically?	☐	☐
10. How frequently: (Check "yes" to one only)		
Monthly?	☐	☐
Quarterly?	☐	☐
Biyearly?	☐	☐
Yearly?	☐	☐
As needed?	☐	☐
Never?	☐	☐
11. Does the program specify or address operational levels of pneumatic dust control systems as part of the general housekeeping program? (See also "Maintenance Program, Dust Control".)	☐	☐
12. Are all dust systems now operating effectively?	☐	☐
13. What type:		
Fabric filter?	☐	☐
Cyclone?	☐	☐
Combined?	☐	☐

Other (specify) _____

	YES	NO
14. Has dust system operation significantly reduced housekeeping needs in applicable area?.....	☐	☐
15. Are dust control systems equipped with fire/explosion suppression or extinguishing devices, explosion dampers, or explosion vents?.....	☐	☐
16. Is dust producing equipment interlocked with dust control systems so as to prevent operation when the dust system has malfunctioned or is inoperative?.....	☐	☐
17. Is collected dust removed from the stock handling stream?....	☐	☐
18. If all or part of collected dust is not returned to stream, is it stored outside of the facility?.....	☐	☐

MAINTENANCE PROGRAM

A rigorous preventive maintenance program is the cornerstone of a smoothly functioning grain elevator. It can also help to prevent accidents. Over the years many fires and explosions have been attributed to equipment malfunction. Most of these might have been prevented by effective maintenance.

Bulk grain handling requires many pieces of equipment. Each piece has to operate as part of a system. In terms of all of these separate pieces of equipment, even a small elevator can be fairly complex. This complexity requires a meticulous attention to detail if the entire system is to operate as intended. Attention to detail is especially critical in a maintenance program. For this reason, a written maintenance program is strongly recommended. Complete equipment files and records of maintenance activities are virtually indispensable. They play an important part in many management decisions and help to promote a safer, more efficient operation.

Although this section of the self-evaluation checklist is in some instances fairly detailed, covering most of the major pieces of equipment likely to be found in a grain elevator, it will require specific tailoring for an individual facility. While many of the major "problem" maintenance areas are addressed, the list will hardly be complete for all users. Therefore, the facility manager is urged to use these guidelines in developing a maintenance program based on the particular needs of his facility.

- General -

	YES	NO
1. Is there a written maintenance program now in use?.....	☐	☐
2. Does the program provide for:		
Preventive maintenance?.....	☐	☐
Operational maintenance and replacement?.....	☐	☐
Emergency maintenance?.....	☐	☐
3. Does the program specify exactly who is responsible for:		
Maintenance activities?.....	☐	☐
General management?.....	☐	☐
Scheduling and inspection during each shift?.....	☐	☐
Performance?.....	☐	☐
4. Are there extra incentives for performing thorough and effective maintenance?.....	☐	☐

- Records -

		YES	NO
5.	Is there a listing of all mechanical and electrical equipment (both spare and in use)?.....	☐	☐
6.	Are up-to-date maintenance files maintained on each piece of equipment?.....	☐	☐
7.	Does each equipment maintenance file include:		
	Equipment drawings?.....	☐	☐
	Parts lists?.....	☐	☐
	Maintenance, lubrication, and operating instructions and schedules?.....	☐	☐
	Service, repair, and replacement records?.....	☐	☐
	A record of how long the equipment has been in operation?.....	☐	☐
	A record of the hours of maintenance work performed?.....	☐	☐
8.	Are these files reviewed regularly?.....	☐	☐

- Performance -

9.	Are employees trained to recognize malfunctioning equipment?..	☐	☐
10.	Are there reporting procedures for equipment which is not operating properly (e.g. work orders)?.....	☐	☐
11.	Are employees trained in the use of these reporting procedures?.....	☐	☐
12.	Following notification, is necessary maintenance always performed within: (Check "yes" to one only.)		
	One hour?.....	☐	☐
	Four hours?.....	☐	☐
	Sometime during same shift?.....	☐	☐
	Next shift?.....	☐	☐
	None of the above (only when someone is available, which varies)?.....	☐	☐

		YES	NO
13.	Is there always followup by a responsible program official after maintenance requests are received to ensure that the work has been completed properly?.....	☐	☐
14.	Is equipment inspected regularly and according to schedule?..	☐	☐

- Bucket Elevators -

Pulleys and Bearings

15.	Are bearings periodically monitored and checked for excessive heat and unusual noises?.....	☐	☐
16.	Are bearings regularly cleaned and lubricated?.....	☐	☐
17.	Are all bearing mount and cover bolts checked for tightness?.	☐	☐
18.	Is shaft movement in the bearing checked?.....	☐	☐
19.	Are bearing locking devices checked?.....	☐	☐
20.	Are pulleys checked for tightness on shafts?.....	☐	☐
21.	Is the head pulley shaft checked to ensure that it is level?.	☐	☐
22.	Are head pulleys (on the up-leg) plumb with tail pulleys and guide pulleys?.....	☐	☐
23.	Are head pulleys (on the down-leg) plumb with the bent pulley?	☐	☐
24.	Is head pulley lagging checked for wear, tightness, and cracks?.....	☐	☐
25.	Are the ends of pulleys checked for cracks or other signs of stress or fatigue?.....	☐	☐
26.	Are pulleys checked to ensure that pulley crown is centered and adequate for proper belt tracking?.....	☐	☐

Leg Belts and Buckets

27.	Are leg belts checked for stretch, damage, and wear on both front and back of belt?.....	☐	☐
28.	Are belts tracking properly on pulleys?.....	☐	☐
29.	Are belt splices checked to ensure that they are in good condition (splice holes not stretched, elongated, or torn, bolts and fasteners tight, no cracks, etc.)?.....	☐	☐
30.	Are edges of belts checked for wear?.....	☐	☐

		YES	NO
31.	Are buckets inspected to ensure repair or replacement of bent or missing buckets?.....	☐	☐
32.	Are all buckets securely fastened to belts?.....	☐	☐
33.	Are belts and buckets checked under different conditions (high and low speed, full and partial load, etc.) to ensure that they are not rubbing or banging against the leg casing?.....	☐	☐
34.	Are belt take-up and tensioning devices checked to ensure that they are operating properly?.....	☐	☐
35.	Are take-up devices regularly monitored to ensure that adequate slack side tension is maintained and always yields acceptable belt tracking and centering on the tail pulley?.....	☐	☐
36.	Are gravity take-up devices monitored to ensure that they prevent the boot pulley from tipping to one side under loaded conditions?.....	☐	☐
	Leg Motors and Drives		
37.	Is the operation of the motor checked regularly?.....	☐	☐
38.	Are mounting bolts for the motor and speed reducer checked periodically for tightness?.....	☐	☐
39.	Are leg drive assemblies checked for proper alignment, vibration and excessive heat during operation?.....	☐	☐
40.	Are chain drive oil baths maintained at the proper level?.....	☐	☐
41.	Are oil levels on reducers checked periodically?.....	☐	☐
42.	Are all seals checked periodically for deterioration and leaks?	☐	☐
43.	Are drive parts lubricated regularly and is oil changed according to schedule?.....	☐	☐
44.	Are backstops on the high speed gear shaft checked periodically to ensure that they prevent the leg from running backwards when loaded?.....	☐	☐
45.	If jacking motors are used, are these checked and maintained regularly?.....	☐	☐
	Leg Casings		
46.	Are leg casings periodically checked for leaks, bent covers, and obstructions?.....	☐	☐

		YES	NO
47.	Is casing alignment checked to ensure that it has not shifted from a vertical position?.....	☐	☐
48.	Are casings checked to ensure that buckets have adequate clearance?.....	☐	☐
49.	Are leg boots periodically inspected and cleaned?.....	☐	☐
50.	Are access and inspection doors checked to make sure that they are tightly in place during leg operation?.....	☐	☐
	Leg Feed and Discharge Spouts		
51.	Is spouting checked periodically for leaks?.....	☐	☐
52.	Are spout linings checked for wear?.....	☐	☐
53.	Are choke feeds, valves, and gates checked periodically to ensure that they are operating properly?.....	☐	☐
54.	Are leg head bucket wipers checked periodically?.....	☐	☐
55.	Are legs checked while operating to ensure that down-legging of grain is minimized?.....	☐	☐
	Leg Control and Safety Equipment		
56.	Are interlocks, lockouts, speed controls, and start and stop controls checked regularly to ensure that they are functioning properly?.....	☐	☐
57.	Are belt slow-down and motion sensors, alignment limit switches or ammeters checked regularly to ensure that they are operating properly?.....	☐	☐
58.	If bearing heat sensors are used, are these inspected regularly?	☐	☐
59.	Are explosion relief vents and panels inspected periodically to ensure that they will function as intended?.....	☐	☐
60.	Are heat sensors or other alarm systems in the leg head inspected regularly?.....	☐	☐
61.	Are explosion suppression and fire extinguishing systems checked regularly?.....	☐	☐
62.	Is leg bonding and grounding checked for electrical continuity?	☐	☐
	Other		
63.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
64.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Belt Conveyors -

Bearings and Pulleys

		YES	NO
65.	Are bearings checked periodically for excessive heat and unusual noise during operation?.....	☐	☐
66.	Are all bearing mounting bolts securely fastened?.....	☐	☐
67.	Are bearings checked for excessive shaft movement in the bearing?.....	☐	☐
68.	Are all bearing alignment and locking devices inspected and tightened if necessary?.....	☐	☐
69.	Are all bearings lubricated according to schedule?.....	☐	☐
70.	Are all pulleys checked for tightness on their shafts?.....	☐	☐
71.	Is head pulley lagging checked for wear, cracks, and tightness?	☐	☐
72.	Are ends of pulleys inspected for cracks or other signs of stress or fatigue?.....	☐	☐
73.	Are take-up pulleys and belt tensioning devices functional?...	☐	☐
74.	Are pulleys checked for vertical (level) and lateral alignment?	☐	☐

Troughing and Return Rolls

75.	Are troughing and return rolls checked for even wear?.....	☐	☐
76.	Are they checked for excessive wear and ease of movement?.....	☐	☐
77.	Are roller stands checked to ensure that they are square with the centerline of the conveyor belt and assembly?.....	☐	☐
78.	Are rollers and roller stands securely fastened?.....	☐	☐
79.	Are rollers lubricated according to schedule?.....	☐	☐
80.	If automatic lubrication is used, are all lines and connections checked for leaks?.....	☐	☐
81.	Are roller stands checked for groves worn by rubbing, misaligned belts?.....	☐	☐

Belting

		YES	NO
82.	Are belts aligned and tracking properly on pulleys and rollers?	☐	☐
83.	Are belts inspected for stretching, tears, and excessive wear?	☐	☐
84.	Are belt splices checked for tears, cracks, and tightness?....	☐	☐
85.	Under operating conditions, is the belt maintained at the proper tension?.....	☐	☐
86.	Are belt wipers functioning properly?.....	☐	☐
87.	Is skirting on belt loaders securely fastened and functioning as intended?.....	☐	☐

Belt Motors and Drives

88.	Are belt motors checked regularly to ensure that they are operating properly?.....	☐	☐
89.	Are drive and motor assemblies checked during operating conditions for alignment, vibration, wear, and excessive heat?...	☐	☐
90.	Are mounting bolts securely fastened?.....	☐	☐
91.	Are oil levels on reducers checked periodically?.....	☐	☐
92.	Are drive parts lubricated regularly and oil changed according to schedule?.....	☐	☐
93.	Are seals inspected for leaks?.....	☐	☐
94.	Are all couplings checked for tightness on their shafts?.....	☐	☐
95.	Are keys and keyways checked for tightness and wear?.....	☐	☐

Control and Safety Equipment

96.	Are interlocks, lockouts, speed controls, and start and stop controls checked regularly to ensure that they are functioning properly?.....	☐	☐
97.	Are ammeters or motion sensors checked regularly?.....	☐	☐
98.	If bearing heat sensors are used, are these inspected regularly?.....	☐	☐

Other

99.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
100.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Screw Conveyors -

Bearings

		YES	NO
101.	Are bearings checked regularly for unusual noises, wear, and heating?.....	☐	☐
102.	Are bearings checked for tightness on shaft?.....	☐	☐
103.	Are thrust, hanger, and front bearings inspected and lubricated regularly?.....	☐	☐

Screw Motor and Drive Assemblies

104.	Are motor and reducer mounting bolts tight?.....	☐	☐
105.	Are seals checked periodically for leaks?.....	☐	☐
106.	Are motor bearings checked and lubricated regularly?.....	☐	☐
107.	Are reducer oil levels checked and oil changed according to schedule?.....	☐	☐
108.	If chain drives are used, are these checked regularly for tension, wear, proper lubrication, and alignment?.....	☐	☐
109.	Are drive assemblies checked regularly for excessive shaft movement and unusual noises?.....	☐	☐

Screws, Troughs, and Spouting

110.	Is the screw properly aligned in the trough?.....	☐	☐
111.	Is the inside of the trough checked for evidence of rubbing and excessive wear?.....	☐	☐
112.	Are all screw shafts and couplings in good condition?.....	☐	☐
113.	Are spouts and troughs tight and free from leaks?.....	☐	☐

Control and Safety Equipment

114.	Are interlocks, lockouts, speed controls, and start and stop controls checked regularly to ensure that they are functioning properly?.....	☐	☐
115.	Are starters checked and cleaned regularly?.....	☐	☐
116.	Are bonding and grounding connections checked for electrical continuity?.....	☐	☐
117.	Are other electrical contacts and conduit checked periodically?	☐	☐

Other

		YES	NO
118.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
119.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Continuous Flow Dryers -

Motors and Drive Components

120.	Are motors checked regularly during operation?.....	☐	☐
121.	Are bearings and belts inspected frequently for unusual noises, excessive wear and play on shafts, and alignment?.....	☐	☐
122.	Are bearings lubricated according to schedule?.....	☐	☐
123.	Are blowers inspected periodically:		
	Hot air blower?.....	☐	☐
	Cold air blower?.....	☐	☐
	Combustion air blower?.....	☐	☐
124.	Are all fan blades inspected regularly?.....	☐	☐
125.	Are reducers checked frequently and operated with proper lubrication levels?.....	☐	☐
126.	Are variable speed drives inspected regularly?.....	☐	☐
127.	Are all mounting bolts tight?.....	☐	☐
128.	Are discharge conveyors operating properly?.....	☐	☐

Burners and Fuel Connections

129.	Are burners inspected and cleaned regularly?.....	☐	☐
130.	Are fuel lines inspected regularly for leaks and damage or corrosion?.....	☐	☐

Miscellaneous

131.	Are dryers inspected both inside and out for cleanliness and material build-up?.....	☐	☐
132.	Are all access and inspection doors inspected regularly for tightness and leaks?.....	☐	☐
133.	Are column screens inspected regularly for holes and tears?...	☐	☐
134.	Are air filters inspected and serviced regularly?.....	☐	☐

Dryer Control and Safety Equipment

		YES	NO
135.	Are interlocks, lockouts, speed controls, and start and stop controls checked frequently to ensure that they are functioning properly?.....	☐	☐
136.	Are switches inspected frequently:		
	Main thermostat?.....	☐	☐
	High heat limit switch?.....	☐	☐
	Exhaust limit switch?.....	☐	☐
	High and low pressure switches?.....	☐	☐
	High and low gas pressure switches?.....	☐	☐
	Low oil temperature switches?.....	☐	☐
	Static pressure switch?.....	☐	☐
137.	Are smoke detectors, product temperature detectors, and flame detectors inspected frequently?.....	☐	☐
138.	Are fire extinguishing or flame suppression systems checked to ensure that they are functioning properly?.....	☐	☐
139.	Are dryer ignition systems in good working order:		
	Spark plug?.....	☐	☐
	Purge timer?.....	☐	☐
	Transformer?.....	☐	☐
140.	Are all electrical connections and conduit inspected frequently?.....	☐	☐
141.	Are bonding and grounding connections tested for electrical continuity?.....	☐	☐

Other

142.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
143.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Truck and Rail Receiving Equipment -

Hydraulic Lifts

		YES	NO
144.	Are oil levels checked frequently and oil changed according to schedule?.....	☐	☐
145.	Are all hoses, pipes, and couplings examined for leaks regularly?.....	☐	☐
146.	Are lift areas inspected frequently to prevent build-up of trash, spilled grain, and other debris?.....	☐	☐
147.	Are hanger bearings and cylinder bearings inspected and lubricated regularly?.....	☐	☐
148.	Are pump reservoirs checked frequently and drained of water which may have accumulated?.....	☐	☐
149.	Are air breathers checked and thoroughly cleaned as needed?...	☐	☐
150.	Are reservoir suction filters regularly inspected and cleaned or replaced if damaged?.....	☐	☐
151.	Are system operating pressures checked frequently and reset if necessary?.....	☐	☐
152.	Are lift frames inspected thoroughly for cracks, excessive rust, and signs of stress and metal fatigue?.....	☐	☐
153.	Are decks securely fastened to the frame?.....	☐	☐
154.	Are all pivot bolts checked and securely fastened?.....	☐	☐
155.	Are all cylinders checked for grooving, pitting, and scratches?	☐	☐
156.	Are cylinder packings examined regularly for leaks?.....	☐	☐
157.	Are cylinder pins and bushings checked for cracks and wear?...	☐	☐
158.	Are pit walls and floors checked for cracks and water leaks?..	☐	☐
159.	If sump pumps are used, are they checked and lubricated frequently?.....	☐	☐

Hopper Pit Gates

160.	Are motor and reducer mounting bolts checked to ensure that they are securely fastened?.....	☐	☐

		YES	NO
161.	Are motors and drive assemblies checked frequently during operation for unusual noises or excessive vibration?.....	☐	☐
162.	Are motors and reducers checked and lubricated according to schedule?.....	☐	☐
163.	Are reducer oil levels checked frequently and oil changed according to schedule?.....	☐	☐
164.	Are chain drive oil baths maintained at the proper levels or lubricated properly?.....	☐	☐
165.	Are chains and sprockets inspected for wear and broken sprocket teeth?.....	☐	☐
166.	Are all drive assembly seals inspected frequently for leaks?..	☐	☐
167.	Are all bearings checked and lubricated frequently?.....	☐	☐
168.	Do gates operate freely?.....	☐	☐
169.	Are rack and pinions checked for condition?.....	☐	☐

Control Equipment

170.	Are start and stop controls regularly checked to ensure that they are operating properly?.....	☐	☐
171.	Are all electrical connections, couplings, and conduit checked for tightness and signs of damage?.....	☐	☐
172.	Are limit switches checked to ensure that they are operating properly?.....	☐	☐
173.	Are starters cleaned regularly?.....	☐	☐
174.	Are all bonding and grounding connections checked for electrical continuity?.....	☐	☐

Other

175.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
176.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Scales -

General

177.	Are controllers and printers checked and cleaned regularly?...	☐	☐
178.	Are load cells inspected and cleaned regularly?.....	☐	☐

		YES	NO
179.	Are test weights and test weight power units inspected and cleaned regularly?.....	☐	☐
180.	Are junction boxes and electrical conduit inspected regularly and checked for tightness?.....	☐	☐
181.	Are air pressure gauges and settings checked periodically?....	☐	☐
182.	Are air line filters checked and cleaned regularly?.....	☐	☐
183.	Are oil and hydraulic fluid levels checked regularly and changed according to schedule?.....	☐	☐
184.	Are all hydraulic hoses, pipes, and couplings inspected for wear and damage?.....	☐	☐
185.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
186.	Are records reviewed periodically to identify problem areas?..	☐	☐

Platform Scales

187.	Are scale platforms checked regularly to ensure that grain, debris, and other foreign material has not accumulated between the platform and the pit walls?.....	☐	☐
188.	Are sump pumps operating properly?.....	☐	☐
189.	Are bumpers and check rods functioning properly?.....	☐	☐
190.	Are lever systems cleaned and regreased periodically?.....	☐	☐
191.	Are scales checked and zeroed frequently to ensure that they are operating properly?.....	☐	☐

Bulk Scales

192.	Is the operation of upper and lower garner gates checked regularly?.....	☐	☐
193.	Are skirtings inspected frequently to ensure that they are not torn, ripped, or loose?.....	☐	☐
194.	Are all limit switches inspected frequently?.....	☐	☐
195.	Are scale bottom liners inspected periodically?.....	☐	☐
196.	Are pneumatic cylinders checked regularly for scoring, scratches, and pitting?.....	☐	☐
197.	Are all seals inspected for leaks?.....	☐	☐

- Distributors and Spouts -

		YES	NO
198.	Are distributors inspected daily to ensure that they are operating properly?.....	☐	☐
199.	Are distributors cleaned and lubricated on schedule?.....	☐	☐
200.	Are spouts checked for proper alignment?.....	☐	☐
201.	Are all bearings and seals inspected regularly?.....	☐	☐
202.	If automatic distributors are used:		
	Are limit switches checked frequently and adjusted?.....	☐	☐
	Are electrical connections, conduits, and connections inspected frequently for tightness and signs of wear?.....	☐	☐
	Are pneumatic or hydraulic positioning systems checked frequently to ensure that they are in good condition and operating properly?.....	☐	☐
203.	Are spouts checked frequently during operation for holes and leaks?.....	☐	☐
204.	Are all spouts mounted securely?.....	☐	☐
205.	Are all spout connections checked for tightness?.....	☐	☐
206.	Are spout liners inspected to ensure that they are tightly secured and in good condition?.....	☐	☐
207.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
208.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Cleaners and Scalpers -

209.	Are cleaners and scalpers frequently checked during operation for unusual noises and proper operation?.....	☐	☐
210.	Are motors, belts, and bearings checked frequently for proper operation, excessive wear, and alignment?.....	☐	☐
211.	Are cleaners and scalpers and their drive assemblies inspected, cleaned, and lubricated according to schedule?.....	☐	☐
212.	Are all bolts securely fastened?.....	☐	☐
213.	Are screens inspected for tears and holes?.....	☐	☐
214.	Are screens properly tensioned?.....	☐	☐

		YES	NO
215.	Are screen supports and braces inspected regularly for excessive wear, cracks, broken welds or other signs of stress or fatigue?.....	☐	☐
216.	Are rubber mounts and springs checked for condition?.....	☐	☐
217.	Are all electrical connections, conduits, and couplings checked for tightness, condition, and signs of damage?.....	☐	☐
218.	Are starters checked and cleaned regularly?.....	☐	☐
219.	Are interlocks, lockouts, speed controls, and start and stop controls checked frequently to ensure that they are functioning properly?.....	☐	☐
220.	Are feed and discharge spouts in good condition?.....	☐	☐
221.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
222.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Pneumatic Dust Control Systems -

General System Operation

223.	Are all gauge readings checked frequently to ensure that the system is operating within design specifications?.....	☐	☐
224.	Is the system checked regularly to ensure that it is properly balanced and that blast gates are correctly adjusted?.....	☐	☐
225.	Is duct work regularly inspected to ensure that it is securely fastened and free of leaks and plugs?.....	☐	☐
226.	Are all collection hoods and pick-ups checked to ensure that they are not clogged and that proper face velocities are maintained?.....	☐	☐

Motor and Drive Assemblies

227.	Are all motor and drive assemblies checked regularly during operations for unusual noises, excessive vibration, and proper alignment?.....	☐	☐
228.	Are all mounting bolts securely fastened?.....	☐	☐
229.	Are all bearings inspected for shaft tightness and excessive wear and heating?.....	☐	☐
230.	Are all bearings cleaned and lubricated on schedule?.....	☐	☐

		YES	NO
231.	Are speed reducer oil levels checked regularly and oil changed according to schedule?.....	☐	☐
232.	Are chain drives properly lubricated?.....	☐	☐
233.	Are chains and sprockets and V-belts and pulleys checked for proper alignment and tension?.....	☐	☐
234.	Are sprockets and pulleys inspected for shaft tightness and for cracks, chips, and excessive wear?.....	☐	☐
235.	If automatic lubrication systems are used, are all pipes, hoses, and couplings checked for tightness, leaks, and damage?	☐	☐

Fans

236.	Are all fans regularly checked for shaft tightness, unusual noises and vibration?.....	☐	☐
237.	Are fans checked regularly for cracks, bent blades, or other damage?.....	☐	☐
238.	Following maintenance procedures, are fans checked to ensure that they are rotating in the proper direction?.....	☐	☐

Filter Bags and Housings

239.	Are all bags inspected regularly to ensure that they are securely fastened and properly tensioned?.....	☐	☐
240.	Are bags inspected for holes, rips, and tears?.....	☐	☐
241.	Are bags checked for blinding and cleaned or replaced according to schedule?.....	☐	☐
242.	Are all inspection and access doors checked for tightness and leaks?.....	☐	☐
243.	Are bag cleaning mechanisms functioning properly?.....	☐	☐
244.	If compressed air is used for bag cleaning, are these systems checked regularly:		
	Compressor?.....	☐	☐
	Tank?.....	☐	☐
	Hoses, fittings, and couplings?.....	☐	☐
245.	Are filter housings inspected regularly during operations for leaks and damage and to ensure that all components are securely fastened?.....	☐	☐

Dust Disposal Systems

		YES	NO
246.	Are rotary valves checked frequently during operation to ensure that dust discharges continuously?.....	☐	☐
247.	Are rotary valve wiper blades checked frequently and replaced according to schedule?.....	☐	☐
248.	Are all spouts, duct work, and dust storage bins checked for plugs or bridging?.....	☐	☐

Control and Safety Equipment

249.	Are interlocks, lockouts, and start and stop controls checked regularly to ensure that they are operating properly?.....	☐	☐
250.	Are all alarms and gauges inspected regularly to ensure that they are functioning properly?.....	☐	☐
251.	Are explosion relief vents and panels checked to ensure that they will function as intended?.....	☐	☐
252.	Are sprinklers or flame suppression devices inspected regularly?.....	☐	☐
253.	Are all electrical connections, conduits, and couplings checked frequently?.....	☐	☐
254.	Are bonding and grounding connections checked for electrical continuity?.....	☐	☐

Other

255.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
256.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Manlifts -

257.	Are splices on manlift belts checked regularly for condition?.	☐	☐
258.	Are belt steps and handholds checked regularly for tightness?.	☐	☐
259.	Are belts checked periodically for tension and alignment and to ensure that belt speed while operating does not exceed 30 FPM?.....	☐	☐
260.	Are all bearings inspected regularly for heating, excessive wear, vibration, and tightness on shafts?.....	☐	☐
261.	Are all bearings lubricated according to schedule?.....	☐	☐

		YES	NO
262.	Are motors and reducers observed periodically during operation for alignment and vibration or unusual noises?.....	☐	☐
263.	Are reducer oil levels checked and oil changed according to schedule?.....	☐	☐
264.	Are motors and tensioning devices inspected and lubricated regularly?.....	☐	☐
265.	Are upper and lower pulleys regularly inspected for cracks and other signs of excessive wear and damage?.....	☐	☐
266.	Are all structural members and braces securely fastened and inspected regularly for cracked welds and other signs of damage?.....	☐	☐
267.	Are manlift brakes tested regularly to ensure that they will hold lift in position with 250 lbs. on each step?.....	☐	☐
268.	Are limit switches inspected and set properly?.....	☐	☐
269.	Are manlift backstops inspected regularly to ensure that they are functioning properly?.....	☐	☐
270.	Are all guards, handrails, and toeboards checked regularly to ensure that they are in place and securely fastened?.....	☐	☐
271.	Are start and stop controls inspected regularly to ensure that they are functioning properly?.....	☐	☐
272.	Are all electrical connections, contacts, and conduit inspected periodically to ensure that they are in good condition?.....	☐	☐
273.	Are bonding and grounding connections regularly checked for electrical continuity?.....	☐	☐
274.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
275.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Passenger Elevators -

276.	Are cables and sheaves inspected frequently for signs of wear or damage?.....	☐	☐
277.	Are electric motors checked regularly during operation for vibration and unusual noises?.....	☐	☐
278.	Are speed reducers inspected frequently for alignment and wear?.....	☐	☐
279.	Are reducers and motors lubricated according to schedule?.....	☐	☐

		YES	NO
280.	Are doors inspected and lubricated regularly to ensure that they are closing properly?.....	☐	☐
281.	Are all structural members and braces securely fastened and inspected regularly for cracked welds and other signs of damage?.....	☐	☐
282.	Are all limit switches checked regularly to ensure that they are operating properly?.....	☐	☐
283.	Are all electrical relays inspected and cleaned or repaired regularly?.....	☐	☐
284.	Are all interlocks and start and stop controls inspected regularly to ensure that they are operating properly?.....	☐	☐
285.	Are all electrical connections, contacts, and conduit inspected regularly for condition and signs of damage?.....	☐	☐
286.	Are bonding and grounding connections checked regularly for electrical continuity?.....	☐	☐
287.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
288.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Safety Equipment -

289.	Is all personal protective equipment inspected regularly and maintained according to manufacturer's specifications?.....	☐	☐
290.	Are handheld fire extinguishers checked and recharged according to schedule?.....	☐	☐
291.	Are maintenance instructions and schedules followed for:		
	Sprinklers?.....	☐	☐
	Standpipes?.....	☐	☐
	Fixed CO_2 extinguishing systems?.....	☐	☐
	Fixed dry chemical extinguishing systems?.....	☐	☐
	Flame and smoke detection systems?.....	☐	☐
	Flame suppression systems?.....	☐	☐
292.	Are bin temperature sensors and controls checked regularly to ensure that they are securely fastened and operating properly?	☐	☐

		YES	NO
293.	Are bin level indicators and controls inspected regularly to ensure that they are securely fastened and operating properly?	☐	☐
294.	Are alarms tested frequently?.....	☐	☐
295.	Are ladders, stairs, and fire doors inspected frequently?.....	☐	☐
296.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
297.	Are records reviewed periodically to identify problem areas?..	☐	☐

- Miscellaneous -

298.	Are there maintenance instructions and schedules for the following:		
	Trippers?.....	☐	☐
	Drag or en masse conveyors?.....	☐	☐
	Vehicles including bobcats, front-end loaders, lift trucks, switch engines, etc.?.....	☐	☐
	Duct work and spouting?.....	☐	☐
	Electrical system as a whole?.....	☐	☐
	Control room equipment?.....	☐	☐
	Water storage and supply systems?.....	☐	☐
	Fuel and chemical storage and supply systems?.....	☐	☐
	Gantries, cranes and other dock equipment?.....	☐	☐
	Grain inspection and sampling equipment?.....	☐	☐
	Winches, hoists, and pumps?.....	☐	☐
	Grinders?.....	☐	☐
	Pellet mills?.....	☐	☐
	Tramp metal screens and magnets?.....	☐	☐
	Hand tools?.....	☐	☐
299.	Are adequate records maintained? (See the first three parts of the section, "Maintenance Program"; questions 1-14.).....	☐	☐
300.	Are records reviewed periodically to identify problem areas?..	☐	☐

PLANT SECURITY PROGRAM

Plant security is a vital part of protecting the substantial investment represented by a grain handling facility. It can be extremely important in preventing losses due to theft, vandalism, and terrorist activity. Limiting access to the premises to authorized personnel helps to ensure that unforeseen accidents and mistakes will be limited.

	YES	NO
1. Has the facility developed and implemented a written security program?	☐	☐
2. Does the program specify plant security responsibilities for:		
Designated management official(s)?	☐	☐
Individual employees and shifts?	☐	☐
Major areas within the facility?	☐	☐
3. Does the program require physical security measures such as:		
Fences?	☐	☐
Flood lights?	☐	☐
Alarms?	☐	☐
Closed circuit television?	☐	☐
Other (specify) _____		
4. Are these measures supplemented with:		
Stationary guards?	☐	☐
Guard patrols?	☐	☐
5. Are guards on duty during plant operations?	☐	☐
6. Are guards on duty while the facility is not operating?	☐	☐
7. What is the extent of guard patrols:		
Perimeter?	☐	☐
Facility?	☐	☐
Rail yards?	☐	☐
Truck receiving and parking areas?	☐	☐
Dock areas?	☐	☐
Other areas in complex?	☐	☐

	YES	NO
8. Does the program control access to the facility (ID's, visitor passes, sign-in and sign-outs)?.....	/_/	/_/
9. Are the following required to furnish ID's for access to the facility:		
Employees?.....	/_/	/_/
Contractors?.....	/_/	/_/
Deliverymen?.....	/_/	/_/
Visitors?.....	/_/	/_/
10. Are all contractors, deliverymen, and other outside persons escorted by elevator officials while on the premises?.....	/_/	/_/
11. Does the plant security force coordinate their activities with local law enforcement authorities?.....	/_/	/_/
12. Are persons prohibited from carrying unauthorized hazardous materials onto the premises?.....	/_/	/_/
13. If an unauthorized person is discovered on the premises, does the program require a search of the facility for possible theft, damage, or sabotage?.....	/_/	/_/
14. Is vehicle access into the premises restricted?.....	/_/	/_/
15. Are all vehicles entering the premises inspected for hazardous materials?.....	/_/	/_/
16. Are vehicles carrying hazardous substances on the premises accompanied by authorized facility employees?.....	/_/	/_/
17. Are security personnel and other physical measures evaluated on a regular basis?.....	/_/	/_/

Friday
February 15, 1980

Part VIII

Department of Labor

Occupational Safety and Health Administration

Occupational Safety and Health Hazards in Grain Handling Facilities; Request for Comments and Information and Notice of Informal Public Meetings

- OPR -
- USDA -

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Parts 1910, 1918, 1926, and 1928

[Docket No. H-117]

Occupational Safety and Health Hazards in Grain Handling Facilities; Request for Comments and Information and Notice of Informal Public Meetings

AGENCY: Occupational Safety and Health Administration (OSHA).

ACTION: Request for comments and information and notice of informal public meetings.

SUMMARY: This notice requests comments and information regarding the regulation of occupational safety and health hazards found in grain handling facilities. In addition, this notice announces that OSHA will hold informal public meetings, as set forth below, to permit oral presentations of additional data and information concerning these hazards. The major safety hazards are fires and dust explosions. The health hazards include exposures to grain dust, both plant and animal matter (biological agents) associated with grain and dust, and pesticides. Although regarded primarly as a serious health hazard, pesticides may also affect the explosives properties of grain dust.

OSHA presently regulates certain safety hazards under standards in Subpart H (29 CFR Part 1910). These standards include provisions that cover safety hazards associated with compressed gases, flammable and combustible liquids, spray finishings, dip tanks, explosives and blasting agents, liquefied petroleum gases, and anhydrous ammonia. OSHA plans to revise its safety standards concerning hazardous materials under Subpart H (29 CFR 1910.101 through 1910.116). The revision may include the addition of new provisions to specifically cover operations such as those in grain handling facilities.

OSHA currently regulates exposures to grain dust under 29 CFR 1910.1000, Table Z-3. These regulations for "inert" or "nuisance dust", however, do not include provisions for exposure monitoring, specific personal protective equipment and other control measures. Studies indicate that exposure to grain dust may result in toxic effects.

OSHA also has permissible exposure limits for some 160 substances which may be used as pesticides (29 CFR 1910.1000, Tables Z-1 and Z-2). However, these standards cover only a small percentage of the total number of pesticides manufactured and formulated in this country. In addition, they only establish airborne concentration limits and general control requirements for the 160 pesticides, and do not address other protective measures such as exposure monitoring, specific personal protective equipment, and medical surveillance.

OSHA does not currently have specific standards regulating occupational exposures to harmful fungi, molds, bacteria or their toxins.

OSHA is hereby seeking written information on both the safety and health hazards associated with grain dust and grain dust exposures and on the factors that must be considered in determining how these hazards should be further regulated if OSHA decides that comprehensive standards for grain handling are necessary.

DATES: Notices of intention to appear at the public meetings as scheduled below must be recieved by March 24, 1980.

The informal public meetings are scheduled as follows:

1. April 15, 16, and 17, 1980, Superior, Wisconsin.

2. April 22, 23, and 24, 1980, Kenner, Louisiana.

3. April 29, 30, and May 1, 1980, Kansas City, Missouri.

The written information requested in this notice must be submitted on or before May 5, 1980.

ADDRESSES: Send all notices if intention to appear to Mr. Tom Hall, Division of Consumer Affairs, Room N3635, U.S. Department of Labor, Occupational Safety and Health Administration, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

The written information requested in this notice should be submitted, in quadruplicate, to the Docket Officer, Docket No. H-117, Room S6212, U.S. Department of Labor, Occupational Safety and Health Administration, 200 Constitution Avenue, N.W., Washington, D.C. 20210 (202) 523-7894.

The Informal Public Meetings are scheduled as follows:

1. April 15, 16, and 17, 1980, Holiday Inn, Superior Room, 110 E. 2nd Street, Superior, Wisconsin 54880.

2. April 22, 23, and 24, 1980, Sheraton Inn, Kenner Room, 2150 Veteran's Boulevard, Kenner, Louisiana 70062.

3. April 29, 30 and May 1, 1980, Federal Building, Room 140, 601 E. 12th Street, Kansas City, Missouri 64108.

FOR FURTHER INFORMATION CONTACT:

Public Meetings

Mr. Tom Hall at the address above, (202) 523-8024.

Health

Dr. Flo Ryer, Director, Office of Special Standards Programs, Directorate of Health Standards Programs, Room N3663, Occupational Safety and Health Administration, 200 Constitution Avenue, NW., Washington, D.C. 20210, (202) 523-7174.

Safety

Mr. Thomas Seymour, Director, Office of Fire Protection Engineering Standards, Directorate of Safety Standards Programs, Room N3463, Occupational Safety and Health Administration, 200 Constitution Avenue, NW., Washington, D.C. 20210 (202-523-7216)

SUPPLEMENTARY INFORMATION:

Background

Grain dust is a mixture of plant fragments, seeds, pollen, minerals, and both living and dead organisms and waste products of organisms. The organisms include insect parts, molds, bacteria, and fungi and fungal spores. Grain dust is generated through all aspects of grain handling, such as harvesting, transportation, storage, conveying, processing, and packaging. Grain dust may be composed of mineral particulates and the particulates of organic material other than grain. Grain dust may be included with grain as part of the marketable raw material or sold as a separate commodity for feed and feed products.

Grain is often infested with weevils and other insects. Under certain conditions, it may also be contaminated with fungi and molds. These biological agents, as well as the pesticides (insecticides and fumigants) used to halt their growth, often pose serious health hazards to grain handlers.

Grain dust particles exhibit a variety of sizes, surface areas, capacitance, and aerodynamic properties. Grain dust particles can aggregate to form larger particles or concentrate in various levels. Because of its composition and physical nature, grain dust can be both toxic and hazardous.

Dust concentrations and particle sizes are factors which influence the potential for explosion. High concentrations of grain dust are fuel sources for either fires or grain dust explosions. The U.S. Bureau of Mines has performed tests that relate particle size to the explosibility of dusts. These tests indicate that as size decreases explosibility increases. Controlled

laboratory tests performed by the Bureau of Mines show that grain dust explosions occurred when 42 percent of the particles were less than 74 microns.

Particles less than 10 microns are of particular concern when considering health effects since they are capable of penetrating the deeper, more sensitive portions of the lung. Inhalation of various sizes of grain dust, ranging from less than 10 microns to as large as 200 microns, has been found to cause respiratory diseases such as emphysema, asthma, and bronchitis.

Pesticides commonly used in grain fumigation include carbon tetrachloride, methyl bromide, ethylene dichloride, ethylene dibromide, phostoxin, carbon disulfide and hydrocyanic acid gas. pesticides used in fumigation are most often chemicals which readily volatilize; however, residues may adsorb to grain dust and other conditions may exist which prevent the dissipation of these toxic chemicals. It is possible that pesticides adhering to the grain dust may alter the explosive characteristics of the dust. In addition, the adsorption of these pesticides onto grain dust particles may increse the severity of the toxic effects of the pesticide residues if they are carried and deposited deep within the lungs by inhalation of grain dust.

The Department of Agriculture has estimated that in 1979, 13 billion bushels of the major grains were produced in this country, requiring the use of approximately 15,000 grain elevators. There are an estimated 225,000 grain elevator workers who are exposed to grain dust. In addition, there are more than 450,000 grain processors who may also be exposed to grain dust.

OSHA Involvement and Activity

In January 1978, following a series of disastrous grain elevator explosions, OSHA focused its attention on the high concentrations of dust found in grain elevators and participated in hazard evaluation meetings with various industry and government representatives. OSHA then issued a Grain Elevator Industry Hazard Alert which contained information about both safety and health hazards. Although the immediate concern was to eliminate conditions that might cause explosions, the alert warned that the serious health hazards associated with grain elevator work may, in the long run, take many more lives than the grain dust explosions. This warning was based upon general information obtained from the NIOSH health hazard surveys of the grain industry. These reports are available from the Docket Officer at a the address given above.

OSHA is presently studying the available scientific literature concerning adverse health effects that result from exposures to grain dust, organic matter and the pesticides used in grain handling operations. Preliminary data indicates that exposures to the dust and organic matter can cause emphysema, chronic bronchitis, fibrosis of the lung, dermatitis, and various allergic reactions that affect both the lung ("farmer's lung") and the skin ("grain itch"). There is also evidence that aflatoxins associated with grain molds can cause cancer. Exposures to pesticides may also cause severe brain, liver, kidney and lung damage, and even death, in grain handling employees.

OSHA has contracted with the National Academy of Sciences (NAS) to study the safety problems in grain handling facilities. The NAS is studying the causes and the prevention of fires and explosions in the grain handling facilities. In addition to the OSHA-NAS effort, the National Institute for Occupational Safety and Health (NIOSH) is conducting similar research with an emphasis on the safety hazards in grain elevators and feed mills. OSHA is evaluating the data and information as it becomes available and will consider the recommendations of both the NAS and NIOSH.

Comments and Information Requested

OSHA has concluded that comprehensive occupational safety and health standards may be needed to protect employees from the hazards found in grain handling facilities. Consequently, OSHA requests all interested persons to submit written and oral comments relating to the need for developing regulations which address both the fire and explosion hazards associated with grain handling operations as well as the health hazards inherent in occupational exposure to grain dust, organic matter associated with grain, and the pesticides used to treat grain. OSHA's decision on the appropriateness of commencing rulemaking proceedings will be based on consideration of all written and oral comments received.

Written Comments

OSHA has developed twelve categories of questions that address both the safety and health hazards found in grain handling facilities, and hereby requests written comments and information on the following:

1. *General Safety Concerns.* (a) Should OSHA require material safety data sheets or equivalent forms that supply employees with basic information (e.g. manufacturer, chemical and trade name, physical and chemical properties, hazards, etc.) for hazardous materials used in grain handling facilities? What information should be contained in these material safety data sheets?

(b) Should OSHA require preplanning for workplace disasters as a part of written emergency action plans? Should such plans require planning and coordination with outside resources such as hospitals, ambulance services, and police and fire departments to ensure appropriate response to workplace disasters? What types and frequency of training should be required for employees who will be affected by such plans? What other elements should be considered for inclusion in such plans?

(c) Is there a synergistic effect between combustible dusts and fumigants which increases the potential for explosions?

(d) Is spontaneous combustion of grain a problem in grain handling facilities?

(e) Are grain elevators operating at overcapacity? What dangers may result from operating at overcapacity?

(f) Are there significant differences between the fire and explosion hazards of the various grain dusts? If so, which grain dusts would require specific provisions? What should be the content of these provisions?

(g) Should operators of grain handling facilities be required to conduct a system safety analysis of their operation? If so, what grain handling facilities should be affected by the requirement and why?

2. *General Health Concerns.* (a) To what extent are the dust, biological and pesticide hazards the same in all grain handling and processing industries?

(b) To what extent are these hazards different in the various grain handling and processing industries?

(c) What other hazards, such as exposures to chemicals used in processing grain, are found in these industries?

3. *Scope and Application.* The grain handling industry can be defined broadly to include all operations involved in processing grain products, from growth of the grain to shipment of the final product to the consumer, or be more narrowly defined to include only some of these operations.

OSHA requests comments and information on the following:

(a) Should the scope and application of a standard for safety and health hazards in grain handling facilities include all industries involved in grain handling or processing (such as grain elevators, grain milling, flour milling,

grain and rice drying, flour and soybean processing, cereal production, grain alcohol production, and the preparation of bakery and confections products)? Are there reasons for excluding any industry or operation?

(b) Are there any other industries that use grain or grain products in which employees risk exposures to these hazards?

4. *Control Measures for Dust Hazards.* OSHA is concerned with the dust hazards which affect employee safety and health in grain handling facilities.

OSHA requests comments and information on the following:

(a) *Preventive Measures.* (i) Should automatic shutdown be required when a segment of the grain handling system fails to function as intended (e.g. dust control equipment failure, bucket elevator slippage, electrical failure, choked legs or conveyors, grinding and milling machine breakdowns, overheated bearings) or when a fire occurs? How often do equipment failures occur?

(ii) Should heat sensor alarms for bearings be required? What bearings should be monitored and at what temperature should alarms activate? What types of sensors should be used?

(iii) Should there be overload relays on motors that stop drive pulleys to avoid over heating if belts slip or bucket elevators become clogged?

(iv) Should there be heat sensors over belt conveyors in galleries and tunnels? If so, where should they be placed and at what temperature should they be set to activate?

(v) Should there be speed indicators on bucket elevators and other conveyor belts to indicate when the speed is so slow that slippage of belts may occur thus causing overheating? At what speed does slippage become a hazard? What should be the alarm and shutdown procedures? Should there be belt alignment sensors? If so, what type?

(vi) Should explosion suppression systems be required in elevator legs, enclosed conveying equipment, grinding and milling machinery, and dust collection equipment? If so, why and what kind? What is the cost of such systems for these operations?

(vii) Should all grain handling facilities be required to have sprinkler system protection throughout the facility? Should the size of the facility determine whether sprinkler systems are necessary? Are sprinkler systems necessary for employee safety?

(viii) Should there be written shutdown procedures for choked legs, stalled conveyor belts or jammed milling machines? Should jogging (a method of shaking loose stalled bucket elevators which tends to suspend dust in air) be prohibited as a method of clearing equipment such as bucket elevators? Should there be written start-up procedures for when the problem is cleared? Should these written shutdown and start-up procedures be distributed to employees or posted at points of operation, or both?

(ix) What criteria should OSHA use to determine the fire resistance and electrical conductivity of conveyor belts? What test procedures should be used?

(x) Should OSHA require explosion venting? Where should the venting be placed and how should the amount of venting be determined? What costs are associated with explosion venting?

(xi) Should new bucket elevator legs be located outside of the main elevator structure? Would this reduce the fire and explosion hazard?

(xii) Should new bearings be located outside of the grain handling equipment, i.e. outside of the casing? Would this reduce the fire and explosion hazard?

(xiii) Should warehousing and bagged finished product facilities be maintained as separate areas from mills and other processing areas by a separate building or by an interior fire wall?

(xiv) Should horizontal surfaces be kept to a minimum to limit the surface area to be cleaned in new grain handling facilities? Should OSHA require that surfaces which are inaccessible for adequate cleaning be inclined not less than 60 degrees?

(b) *Dust Control.* (i) What design criteria should be used for dust control systems? Should the employer be required to receive a certified affidavit from the equipment supplier and installer that the dust control equipment meets the employer's specifications? Should an acceptance test be conducted to assure that newly installed dust control equipment functions properly?

(ii) Should dust collection equipment be of the two stage type, i.e. cyclone and fabric filter? Are there other types of collection systems that can effectively control grain dust emissions?

(iii) What engineering controls are currently used in grain handling facilities? How efficient are these controls in controlling dust emissions?

(iv) Are special dust controls necessary for those grain handling facilities that only store grain dust or process dust for feed?

(v) Should dust particles smaller than 40 microns (or some other size) be prohibited from being returned to the grain stream in any facility? What time period should OSHA allow for installation of dust collection systems?

(vi) What effects, if any, do the various handling operations have on the amount of dust that accumulates in the grain? Do these operations affect the size of the grain dust and consequently the efficiency of the dust collecting systems?

(vii) Should captured dust be stored away from grain handling facilities? How far away and in what manner?

(viii) Should there be a periodic inspection of dust control equipment to detect malfunctioning of the blower and exhaust system? If so, how often? What factors should be considered in such an inspection (e.g. checking the pressure drop across the fabric filter and monitoring the air velocity)? What pressure drop across a fabric filter should be permitted?

(ix) Should gauges on filters and collectors be read and recorded daily? If not daily, then how often?

(x) Would a modification of the U.S. Department of Agriculture's grading schedules for grain affect the concentrations of dust in the workplace? Could a grading schedule modification result in increased protection for employees?

(c) *Ignition Sources.* (i) Do static sparks generated by static electrical charges have enough energy to trigger an explosion in a grain handling facility? If so, what equipment in the facility should be designed to control static electrical charges? Should machinery and mechanical equipment be grounded to electrical system grounds? Should there be a periodic check for electrical ground? If so, how frequent?

(ii) Should grain handling facilities be equipped with lightning and voltage-surge protection? If so, who should be allowed to install such systems?

(iii) What factors and conditions could constitute hazardous areas in grain handling facilities that should be classified according to the Article 500 of the National Electrical Code (NFPA 70) as Class II, Division I or Division II hazardous locations? Under what conditions should a Division I location be reduced to a Division II location?

(iv) Should OSHA require the removal of tramp metal from the grain stream to decrease the possibility of fire and explosion due to tramp metal? Where should tramp metal collectors be required? What is the best method of removal? Are grates and screens with mesh of 1½ inches squared acceptable in lieu of magnetic collectors? What should be the maximum allowable time frame for the installation of tramp metal collectors? What is the cost of an installed tramp metal collector?

(v) Should specific smoking areas be designated in grain handling facilities or

should smoking be prohibited throughout the facility?

(vi) Should OSHA require nonsparking buckets on elevator legs? What time frame should be allowed for conversion from metal buckets? How much would this conversion cost?

(vii) Should the use of self-extinguishing PVC (polyvinyl chloride) belts be required for bucket elevators because of their propensity to soften and melt as opposed to burning? What time frame should be allowed for conversion?

(viii) Under what conditions should employees in grain handling facilities be required to wear static-free clothing and shoes? What is the cost of a set of static-free clothing?

(ix) What safety precautions should be specified for cutting and welding operations in grain handling facilities? Should a "hot work" permit system be required?

(x) Should the operation and construction of grain dryers be as described in Chapter 5 of the latest edition of NFPA Code 61–B, "Grain Elevators, Bulk Handling Facilities"? Should a phase-in period be granted to make the necessary changes? If so, how long?

(d) *Housekeeping and Maintenance.* (i) What is the best method of removing dust accumulations?

(ii) Do present industry practices include employing a spearate crew for housekeeping? If not, how does the grain industry manage housekeeping in their facilities? What housekeeping procedures are currently practiced by the industry?

(iii) Should removal of dust by the use of compressed air (blow down) be prohibited because of the suspended dust it creates? If not, under what conditions should it be permitted?

(iv) What measures should be included in a written preventive maintenance program?

(v) Should there be a periodic shutdown of grain handling oprations for maintenance? How often? Should continuous maintenance be required instead? How much down time will be needed for maintenance if there are periodic shutdowns of grain handling operations?

(vi) Is there an acceptable level of dust accumulation (layers of dust) in grain handling facilities? For instance, should 1/16 inch be an acceptable level of accumulated dust? Where and how should the level be measured?

(vii) Should the inside walls of grain elevators be painted to reduce dust adherence? Would the paint provide a surface for static electricity adhesion of dusts? Would dangerous static electricity potentials develop on painted surfaces?

(viii) Should all grain handling facilities be required to have pneumatic dust control systems? If so, why?

(ix) What procedures have been established to keep grain handling facilities clear of any decomposed or spoiled grain or processed material?

5. *Grain Dust Exposure.* One of the principal occupational health hazards of the grain industry is exposure to grain dust. OSHA requests comments and information on the following:

(a) At what level should OSHA set a permissible exposure limit for grain dust?

(b) Should OSHA set permissible exposure limits for total and respirable dust fractions?

(c) Should OSHA set limits for the different components of grain dust?

(d) To what extent do the following factors complicate the general assessment of occupational exposure: (1) The seasonal nature of grain handling work activity; (2) the variations in exposure during any given period; and (3) athe variability of physical and chemical composition of grain dust.

(e) To what levels of grain dust are employees of the grain handling industry currently exposed?

(f) Does the practice of returning dust back into the grain stream increase employee exposures to grain dust within the workplace?

(g) Are different dust levels generated by different operations? What dust levels are associated with the various operations?

(h) What kinds of personal protective equipment are used by the industry to reduce employee exposures to grain dust? To what extent is this equipment used?

(i) What is the yearly cost for providing personal protective equipment to control dust exposure?

(j) What are the standard operating procedures followed by industry for personal protective equipment programs?

6. *Pesticide Exposure.* Exposure to pesticides is the second major health hazard found in the grain handling facilities. Work practices and procedures can be designed to limit employee exposure to pesticide-treated grain and can reduce this hazard.

OSHA has permissible exposure limits for airborne concentrations of about 160 substances used as pesticides. In addition to these standards, the Environmental Protection Agency has regulations regarding the registration and application of pesticides. OSHA requests comments and information on the following:

(a) what kinds and amounts of pesticides are used in grain handling operations? In grain processing?

(b) How are pesticides applied to the grain?

(c) At what stages of grain handling are pesticides applied to the grain (e.g. unloading, loading, storage, moving through elevators, etc.)?

(d) What are the contents of labels or other warnings that currently appear on pesticides containers?

(e) Is grain often treated with pesticides before it arrives at the grain handling facilities? Do railcars and trucks containing pesticide-treated grain carry signs and placards that adequately warn of pesticide hazards?

(f) What procedures and work practices are used to prevent employee exposures to pesticides when employees unload incoming grain, enter bins, hopper cars or other confined spaces, or work in facilities that handle pesticide-treated grain?

(g) What type of testing is currently performed to measure pesticide exposure levels prior to unloading the grain, and before entering hopper cars, bins or other confined spaces? Besides testing for pesticides, are oxygen deficiency tests performed?

(h) What procedures and work practices are currently used to prevent employee exposures to pesticides during fumigation operations?

(i) To what extent does the industry use personal protective equipment to protect employees from pesticide exposure? During what procedures?

(j) What types of protective equipment are used to protect applicators of pesticides from pesticide hazards?

(k) What types of protective equipment are used to protect non-applicators of pesticides from the hazards of pesticide exposure?

(l) What personal protective equipment is used when employees probe or grade the grain?

(m) What is the cost per employee to provide him with personal protective equipment for pesticide protection?

(n) What health effects and symptoms have employees suffered upon exposures to pesticides?

(o) To what extent will protective measures to control exposures to grain dust also protect against pesticide exposure?

7. *Biological Agents Associated with Grain Dust.* (a) How should exposures to molds, fungi, bacteria and toxins be regulated?

(b) If dust emissions are controlled, will biological agents be controlled as well?

(c) Do decaying grains which have not been removed from work surfaces create additional biological hazards?

8. *Surveillance Procedures and Other Work Practices.* A comprehensive regulation to control employee exposures to occupational hazards in grain handling facilities would include work practices and procedures, precautions for safe use, exposure monitoring, and other provisions to ensure employee protection.

OSHA requests comments and information on the following:

(a) To what extent does the grain industry monitor grain handling facilities for employee dust exposure?

(b) To what extent does the grain industry monitor grain handling facilities for employee pesticide exposure?

(c) To what extent does the grain industry monitor grain handling facilities for employee exposures to other chemicals or substances used in grain processing?

(d) How often is monitoring done?

(e) What type of medical surveillance programs have been instituted by the industry?

(f) What specific medical tests are performed to evaluate the health of the grain handlers?

(g) Should grain handlers be given pulmonary functions tests and skin sensitivity tests? If so, how often?

(h) What personal protective equipment is used by employees cleaning up dust, grain or spilled pesticides?

(i) What general hygiene practices are followed by the industry?

9. *Employee Training.* (a) How often and to what extent should employees handling grain be trained in recognizing safety and health hazards? What elements should be included in the training?

(b) What specific training should be given in the use of personal protective equipment and clothing? How often?

(c) How often should safety and health meetings be conducted?

10. *Fire Protection and Means of Emergency Escape.* (a) Should there be periodic fire drills in grain handling facilities? How often?

(b) Should a standpipe and hose system be required in grain handling facilities? Where should it be located?

(c) Should OSHA require the use of a fire alarm system in grain handling facilities?

(d) Should employees attempt to fight incipient fires in grain handling facilities? If so, under what conditions?

(e) Should emergency lighting be required in grain handling facilities?

(f) Should OSHA recognize special means of emergency escape from grain handling facilities? For example, should ladders be an acceptable means of emergency escape from the tops of silos, galleries, and headhouses?

11. *Economic and Environmental Impact.* If OSHA determines that regulation of the safety and health hazards in grain handling facilities is necessary, then a formal regulatory analysis may be required. OSHA requests comments and information on the following:

(a) What would be the economic impact of a regulation to control employee exposure to the health hazards in grain handling facilities? What benefits would result from such a regulation?

(b) What would be the economic impact of a regulation to prevent fires and explosions in grain handling facilities? What benefits would result from such a regulation?

(c) What would be the environmental impact of regulating the safety and health hazards in grain handling facilities?

(d) What are the current costs of maintaining the safety and health of employees in grain handling facilities? Please include indications of costs for labor, capital, maintenance, training, medical surveillance, and appropriate control measures.

12. *Miscellaneous.* OSHA requests comments and information on the following related topics:

(a) Should the health hazards found in grain handling facilities be addressed in a separate health standard or combined with safety standard provisions to form a comprehensive standard for grain handling facilities?

(b) Should the health hazard regulations be three separate standards specific for grain dust, pesticides, and biological agents?

(c) Should OSHA regulate the safety hazards in performance or goal-oriented standards which would be designed to provide more flexible compliance practices? How could this be achieved?

(d) What test methods and certification criteria are necessary for personal protective equipment to be used in grain handling facilities?

(e) Are currently available personal protective equipment and clothing effective and suitable for conditions found in grain handling facilities or is additional research necessary?

(f) What machine guards are necessary for grinding and milling operations, conveyor equipment and related machinery in grain handling and processing facilities? What types of machine guards have been found to be effective and why?

Public Meetings

In order to provide an informal forum in which interested persons can orally present comments and information regarding the hazards discussed in this notice, OSHA has scheduled three public meetings as follows:

1. April 15, 16, and 17, 1980, Holiday Inn, Superior Room, 110 E. 2nd Street, Superior, Wisconsin 54880.

2. April 22, 23, and 24, 1980, Sheraton Inn, Kenner Room, 2150 Veteran's Boulevard, Kenner, Louisiana 70062.

3. April 29, 30, and May 1, 1980, Federal Building, Room 140, 601 E. 12th Street, Kansas City, Missouri 64108.

Each meeting will begin promptly at 9:00 a.m., will recess from 12 noon until 1:30 p.m., and then continue until 5:00 p.m. The chairperson of each meeting will be a representative of the U.S. Department of Labor designated by the Assistant Secretary, and will have the necessary authority to regulate the conduct of the meetings.

OSHA requests that any person wishing to make oral presentations notify OSHA in advance. The notice should identify the person and/or organization intending to testify, the amount of time requested for oral presentation, the subject matter, and a brief summary of the intended oral presentation. All persons giving written advance notice will have time reserved for oral presentations. Persons who do not submit advance notice, but still wish to testify, are requested to register at the meeting they attend.

As long as time permits, all persons who wish to be heard will be allowed to make oral presentations. However, priority will be given to those who register in advance.

All persons desiring to participate in the public meetings must file a notice of intention to appear, by March 24, 1980, addressed to Mr. Tom Hall, Division of Consumer Affairs, Room N3635, U.S. Department of Labor, Occupational Safety and Health Administration, 200 Constitution Avenue, NW., Washington, D.C. 20210. All written comments requested in the notice should be submitted in quadruplicate, to the Docket Officer, Docket No. H–117, Room S6212, U.S. Department of Labor, Occupational Safety and Health Administration, 200 Constitution Avenue, NW., Washington, D.C.20210. All written and oral submissions, as well as other information gathered by the agency, will be considered in any action taken.

This document was prepared under the direction of Eula Bingham, Assistant

Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, D.C. 20210.

(Sec. 6 Pub. L. 91–596, 84 Stat. 1593 (29 U.S.C. 655) 29 CFR Part 1911; Secretary of Labor Order No. 8–76 (41 FR 25059)

Signed at Washington, D.C., this 12th day of February, 1980.

Eula Bingham,

Assistant Secretary of Labor.

[FR Doc. 80–5038 Filed 2–14–80; 8:45 am]

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DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Parts 1910, 1913, 1926, and 1928

[Docket No. H-117]

Occupational Safety and Health Hazards in Grain Handling Facilities; Extension of the Comment Period

AGENCY: Occupational Safety and Health Administration (OSHA).

ACTION: Extension of the deadline for the submission of comments and information on the safety and health hazards associated with grain handling.

SUMMARY: This notice extends the comment period for written responses to the questions OSHA presented in the "Occupational Safety and Health Hazards in Grain Handling Facilities; Request for Comments and Information" (45 FR 10732).

DATES: Written responses to the notice must be submitted on or before June 30, 1980.

ADDRESS: The written information should be submitted, in quadruplicate, to the Docket Officer, Docket H-117, Room S6212, U.S. Department of Labor, Occupational Safety and Health Administration, 200 Constitution Avenue, NW., Washington, D.C. 20210; (202) 523-7894.

FOR FURTHER INFORMATION CONTACT:

Health. Dr. Flo Ryer, Director, Office of Special Standards Programs, Directorate of Health Standards Programs, Room N3663, Occupational Safety and Health Administration, 200 Constitution Avenue, NW., Washington, D.C. 20210; (202) 523-7174.

Safety. Thomas Seymour, Director, Office of Fire Protection Engineering Standards, Directorate of Safety Standards Programs, Room N3463, Occupational Safety and Health Administration, 200 Constitution Avenue, NW., Washington, D.C. 20210; (202) 523-7216.

SUPPLEMENTARY INFORMATION: On February 15, 1980, OSHA published in the Federal Register (45 FR 10732) a "Request for Comments and Information" regarding the safety and health hazards associated with grain handling. In the notice, OSHA requested written responses to questions divided into twelve safety and health categories, and also announced the following schedule for informal public meetings: April 15-17 in Superior, Wisconsin; April 22-24 in Kenner, Louisiana; and April 29-May 1, Kansas City, Missouri. The written responses were to have been received by OSHA by May 5, 1980.

OSHA has received several requests to extend the comment period. In order to ensure that these interested parties have sufficient time to compile data and prepare responses to the issues raised in the notice, OSHA has decided to extend the written comment period to June 30, 1980. The schedule for the informal public meetings has not been changed.

Submission of Written Comments

Written responses to the "Occupational Safety and Health Hazards in Grain Handling Facilities; Request for Comments and Information" must be submitted, in quadruplicate, on or before June 30, 1980. The comments should be sent to the Docket Officer, Docket No. H-117, Room S6212, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, D.C. 20210.

(Sec. 6 Pub. L. 91-596, 84 Stat. 1593 (29 U.S.C. 655). 29 CFR Part 1911; Secretary of Labor Order No. 8-76 (41 FR 25059))

Signed at Washington, D.C., this 24th day of March, 1980.

Eula Bingham,

Assistant Secretary of Labor.

[FR Doc. 80-9868 Filed 3-31-80; 8:45 am]

BILLING CODE 4510-26-M

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Parts 1910, 1918, 1926, and 1928

[Docket No. H-117]

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(Sec. 6 Pub. L. 91-596, 84 Stat. 1593 (29 U.S.C. 655). 29 CFR Part 1911; Secretary of Labor Order No. 8-76 (41 FR 25059))

Signed at Washington, D.C., this 24th day of March, 1980.

Eula Bingham,

Assistant Secretary of Labor.

[FR Doc. 80-9856 Filed 3-31-80; 8:45 am]

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